The IRON AGE

Vol. 163, No. 25 June 23, 1949

GEORGE T. HOOK
Publisher

o o o

B. H. HAYES
Production Manager

O. L. JOHNSON
Director of Research

o o o

CHARLES T. POST
Manager Circulation and Reader Service

o o o

J. R. HIGHT
Promotion Manager

o o o

Executive Offices
Chestnut and 56th Sts.
Philadelphia 39, Pa., U.S.A.
Editorial and Advertising Offices
100 E. 42nd St., New York 17, N. Y., U.S.A.

o o o

Regional Business Managers

FRED BANNISTER
W. Hartford 7, Conn.
62 La Salle Road

ROBERT F. BLAIR
Cleveland 14
1016 National City Bank Bldg.

C. H. OBER
H. E. LEONARD
New York 17
100 E. 42nd St.

PEIRCE LEWIS
Detroit 2
103 Pallister Ave.

B. L. HERMAN
Philadelphia 39
Chilton Bldg.

STANLEY J. SMITH
Chicago 3
1134 Otis Bldg.

J. M. SPACKMAN
Pittsburgh 22
814 Park Bldg.

R. RAYMOND KAY
Los Angeles 28
2420 Cheremoya Ave.

o o o

One of the Publications Owned and Published by
CHILTON COMPANY
(Incorporated)

OFFICERS AND DIRECTORS
JOS. S. HILDRETH, *President*
EVERIT B. TERHUNE Vice-President
P. M. FAHRENDORF Vice-President
G. C. BUZBY Vice-President
CHARLES J. HEALE Vice-President
WILLIAM H. VALLAR, Treasurer
JOHN BLAIR MOFFETT, Secretary
HARRY V. DUFFY D. ALLYN GARBER
GEORGE T. HOOK

o o o

GEORGE MAISWINKLE, Asst. Treas.

o o o

Chilton Editorial Board
PAUL WOOTON
Washington Representative

o o o

Member, Audit Bureau of Circulations

o o o

Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday. Subscription Price United States, its Territories and Canada $8; other Western Hemisphere Countries $15; Foreign Countries $25 per year. Single copy, 35c. Annual Review Number, $2.00.

o o o

Cable Address. "Ironage" N. Y.

o o o

Copyright, 1949, by Chilton Company (Inc.)

Editorial

A Compliment ... 57

o o o

Technical Articles

Milling Supercharger Bucket Blades From Bar Stock ... 60
New Electrolytic Tinning Bath Studied ... 64
Welding Compressor Shells ... 65
Ultrasonic Testing of Aircraft Components ... 66
Oxygen Enrichment in the Low-Shaft Furnace ... 70
Forging Crankshafts One Throw At a Time ... 71
Producing Ball and Roller Bearings ... 74
Broaching Automotive Door Hinges ... 81
Production Use of Boron Steels ... 82
New Equipment ... 83

o o o

Features

Fatigue Cracks ... 44
Dear Editor ... 46
Newsfront ... 59
Assembly Line ... 90
Washington ... 94
West Coast ... 98
Personals ... 102
European Letter ... 108
Industrial News Summary ... 111
News of Industry ... 113

o o o

News and Markets

Freight Car Buying Wilts ... 113
Pig Iron Price Testing Due ... 115
Industrial Briefs ... 116
No Cutbacks In Auto Output ... 117
Malleable Founders Seeking Markets ... 120
Reveal Results of Trading Program ... 123
Machine Tool Developments ... 154
Nonferrous News and Prices ... 156
Iron and Steel Scrap News and Prices ... 159
Comparison of Prices by Week and Year ... 162
Finished and Semifinished Steel Prices ... 164
Alloy Steel Prices ... 165
Pipe and Tubing Prices ... 166
Warehouse Steel and Pig Iron Prices ... 167
Ferroalloy Prices ... 168

o o o

Index to Advertisers ... 188
Dear Customer ... 189

How to streamline Your Steel Inventory

During the past period, steel users naturally have been most interested in getting the steel they needed without too much emphasis on quality. Inventories were built up as much as possible because of excessive demand and uncertain supply.

Now, the time has come when industry can begin to streamline inventories and can place more emphasis on quality. While a few products remain on the critical list, a balance between supply and demand has been reached for most steels. Under these conditions, yesterday's "normal" inventory may loom large and steels of doubtful ancestry may prove a liability.

We are glad to be in a position again to recommend that you keep your inventory at a practical working level and use our warehouse stocks as your inventory reserve. The many Ryerson Steel-Service Plants throughout the country are particularly well equipped to help you keep your inventory streamlined. Carbon, alloy and stainless steels in thousands of analyses, shapes and sizes are ready for quick shipment—and their uniform high quality is assured by our Ryerson Certified Steel Plan.

So don't let changes in market conditions or product design catch you with high inventories. As warehouse stocks improve we suggest that you extend a conservative buying policy over an increasing range of your steel requirements and keep in touch with us for your current needs.

PRINCIPAL PRODUCTS

BARS—carbon & alloy, hot rolled & cold finished
SHAFTING—cold finished, ground & polished, etc.
STRUCTURALS—channels, angles, beams, etc.
PLATES—sheared & U. M., Inland 4-Way Floor Plate
SHEETS—hot & cold rolled, many types & coatings
TUBING—seamless & welded, mechanical & boiler tubes
STAINLESS—Allegheny bars, plates, sheets, etc.
REINFORCING—bars and accessories
MACHINERY & TOOLS—for metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

100 E. 42nd ST., NEW YORK 17, N. Y.
ESTABLISHED 1855

o o o

June 23, 1949

o o o

GEORGE T. HOOK
Publisher

o o o

TOM C. CAMPBELL
Directing Editor

o o o

W. A. PHAIR
Managing Editor

o o o

Editorial Staff

Metallurgical Editor...E. S. KOPECKI
Machinery Editor.....T. E. LLOYD
Art Editor.....F. J. WINTERS
News Editor .....W. V. PACKARD
Associate Editor..H. W. VAN CAMP
Associate Editor....A. D. STOUT, JR.

o o o

Contrib. Editor.....J. S. LAWRENCE

Foreign Editors

England (Contrib.)...F. H. HARLEY
54 Priory Way, North Harrow, Middlesex, England
Canada (Contrib.)...F. SANDERSON
330 Bay St., Toronto, Canada
Paris (Contrib.).....PIERRE BENOIT
59 Rue Manin, Paris XIX, France

Regional News and Technical Editors

G. F. SULLIVAN
Pittsburgh 22
814 Park Bldg.

D. I. BROWN
Chicago 3
1134 Otis Bldg.

JOHN ANTHONY
Philadelphia 39
Chilton Bldg.

EUGENE J. HARDY
KARL RANNELLS
GEORGE H. BAKER
Washington 4
National Press Bldg.

W. A. LLOYD
Cleveland 14
1016 National City Bank Bldg.

W. G. PATTON
Detroit 2
103 Pallister Ave.

OSGOOD MURDOCK
ROBERT T. REINHARDT
1355 Market St., San Francisco 3

Editorial Correspondents

L. C. DEAN
Buffalo
N. LEVENSON
Boston
JOHN C. McCUNE
Birmingham
ROY EDMONDS
St. Louis
JAMES DOUGLAS
Seattle
HERBERT G. KLEIN
Los Angeles

A Compliment

SENATOR MAYBANK of South Carolina, Chairman of the Senate Banking and Currency Committee, recently introduced a bill calling for the appointment of a national monetary commission. The Senate approved the bill unanimously.

Unfortunately, the field covered by the proposed monetary commission does not lend itself easily to popular exposition. For the average layman, this is an intellectual no-man's land in which he can get lost too easily, in which he is assailed by "last words" coming from scholars who do not agree with each other, in which the things dealt with seem like remote abstractions.

This is unfortunate because nothing affects the future of the country more vitally, or the immediate interests of the layman more intimately, than the decisions which will have to be taken in this field in the future. These decisions are as close to the individual citizen as his payroll and his lunch pail. For the country at large, these decisions will affect our financial integrity and our personal liberties.

The field of this commission will embrace the dollar, the fiscal practices of the Treasury, the public debt, the independence of our banking system. Should the dollar in which the American worker is paid be a meaningless, fraudulent I O U or a dollar redeemable at the option of the holder in gold? When should this country return to an honest gold standard and on what basis? Shall it be the present fictitious base of 1/35th of an ounce of gold, or some other?

Should we fix as an integral part of national policy the practice of deficit financing under which the government deliberately spends more than it collects on the ground that "net additions to purchasing power" generated by such practice are salutary economic stimulants? Should we regard a huge public debt as a permanent fixture on the ground that repayment would be deflationary, that a large volume of governments is necessary for our banks and insurance companies?

Should the rate at which the government borrows be determined by the Treasury or subject to the free forces of the open market? Should the rate on the government debt be reduced deliberately and continuously until the bondholder, as present British socialists anticipate, expires from income anemia and the inability to sell his bonds?

Should the Federal Reserve Board be granted those "qualitative" and "quantitative" credit controls for which its spokesmen are clamoring on the ground that this particular group of executive appointees will thereby be able to stabilize the economy? Should the International Monetary Fund be confirmed in its present power to maintain a fantastic fabric of exchange ratios which have no contact with the realities of value?

The average layman does not realize that these are wide open doors through which the Executive and his agencies can circumvent all the constitutional barriers against dictatorship. Through them a gradual, suffocating inflation becomes possible, an inflation so subtle that the very author can demand and get added dangerous power to control the identical force which he himself has released.

The appointment of such a monetary commission always opens the possibility of packing to produce opinions that are congenial to the ruler. It is, therefore, a superlative compliment to Senator Maybank that President Truman and Secretary of the Treasury Snyder immediately expressed opposition to the appointment of such a commission. It might prove an embarrassing monetary grand jury.

Joseph Stagg Lawrence

Inland Steel, too, Is Made to *Your* Order

In preparing fine pastries, the baker's creative abilities are channeled according to your preferences. In like manner, your specific requirements govern the making of Inland steel. Furnishing job-fitted steel . . . acting quickly when fast action is necessary . . . is possible because Inland is a completely integrated producer, whose centralized facilities enable prompt decisions. And to every order are added friendly, personal interest and careful checking through each phase of production.

INLAND STEEL CO., 38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

INLAND STEEL

BARS • STRUCTURALS • PLATES
SHEETS • STRIP • TIN PLATE
FLOOR PLATE • PILING • RAILS
TRACK ACCESSORIES

. . . and
This "Inland Team"
Gives Your Steel
Their Personal Attention

METALLURGY SALES OPERATIONS

► Outlook for continued high demand for automotive steel is good through August. Barring strikes or a drastic economic tailspin, most observers feel the auto market will hold within 5 pct of the present level. After Labor Day is anybody's guess---with many observers leaning toward the pessimistic side.

► Strippable plastic is being used as a preservative coating for large airframe jigs, fixtures and patterns that are stored in open areas. Greatest economy is in the fact the parts are ready for immediate reuse without extensive repairs and reworking. Costing no more than a good grade of enamel, the coatings are easily applied and removed.

► Photo electric scanning or inspection of Magnaflux indications on pipe welds has been perfected. A pipe mill is planning to add this inspection method to its line in which Magnafluxing to locate welding defects is already being done on a continuous basis. The automatic inspection method includes simultaneous marking of location of defects which are later repaired.

► Industrialists are privately worried about social security costs. They admit such concessions may have ground for being. But they say that in some cases the costs run as much as 20¢ an hr. There is no one to pay for this except the consumer but he seldom knows he does. It means higher prices over the long term. Social security costs are inflexible.

► In England blame for an accident resulting from the explosion of a live shell in a German gun barrel cut up for scrap has been apportioned--80 pct to the third party (Iron and Steel Disposals Ltd.) and 20 pct to defendants (United Steel). Justice Jones said "defendants were entitled to expect it would have been examined thoroughly by the third party before being shipped from Hamburg...But there was failure to test if there was a live shell in the gun."

► The first double housing, triple head, duplicating planer has been shipped. The machine will simultaneously cut profiles on three sides of a cast iron block and will use carbide tipped tools.

► In contrast to the days when steel buyers took all the steel in sight and then reached out for more, some metalworking plants are now ordering steel only when actual orders are on hand to use it. On several occasions plants which have attempted to follow this policy have been caught short, requiring special help from the mills to get them out of a jam.

► Adding to the woes of freight car builders whose backlogs are disappearing fast is the discovery that export possibilities are getting dimmer. Not only are European builders coming back quickly but a 4000-car South African inquiry has been recalled. South Africans will expand facilities and build the cars there.

Freight car people are toying with an idea to keep cars in good shape, orders stabilized and prices not too high. Whether it will come about remains to be seen. Idea is to treat freight cars like capital equipment that must be retired after say 25 years. Each year a fund would be set aside to buy new cars as old ones are retired. This would prevent bunching the orders, holding up delivery and might stabilize the price because everyone would not be ordering at once.

► Induction hardening has been incorporated into the tool set of eight spindle automatic screw machines whereby fully machined and hardened parts are produced. After the cut off the heated parts drop into the cutting oil tank where they are quenched.

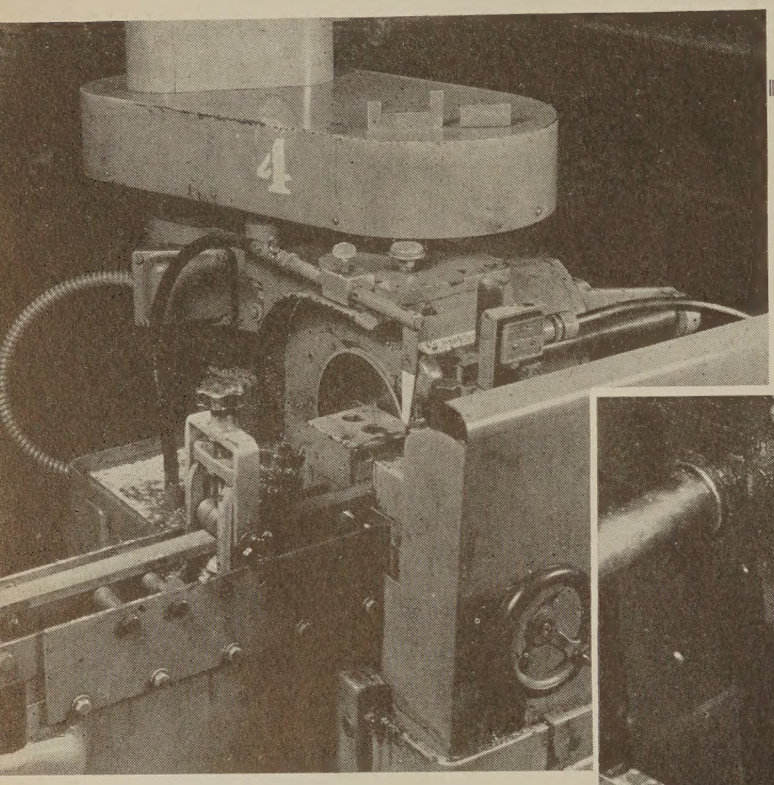
► Product mix---the ability of big steel companies to continue producing a wide range of products despite the decline in wire, bars, alloy, stainless and some other lines---is the No. 1 answer to the question of why their overall operations haven't dipped as sharply as those of the smaller firms that make a limited range of products.

► At least three makes of amateur motion picture equipment will have sound projectors on the market this year. Eastman and Armour Research Foundation have just signed an agreement which will make available 8 mm film with a magnetic sound track attached.

► In past years the unions have done a good job on local and community fund drives including charities. Officials have been on major committees and have put heat on membership to do their part. Recently there has been a trend to pull out of this. Labor people say the workers can't afford it. One answer is that the "rich corporations" must take a greater part. The big question is that worker support is needed in years to come because of the larger number of contributors. Big single contributors are becoming a thing of the past.

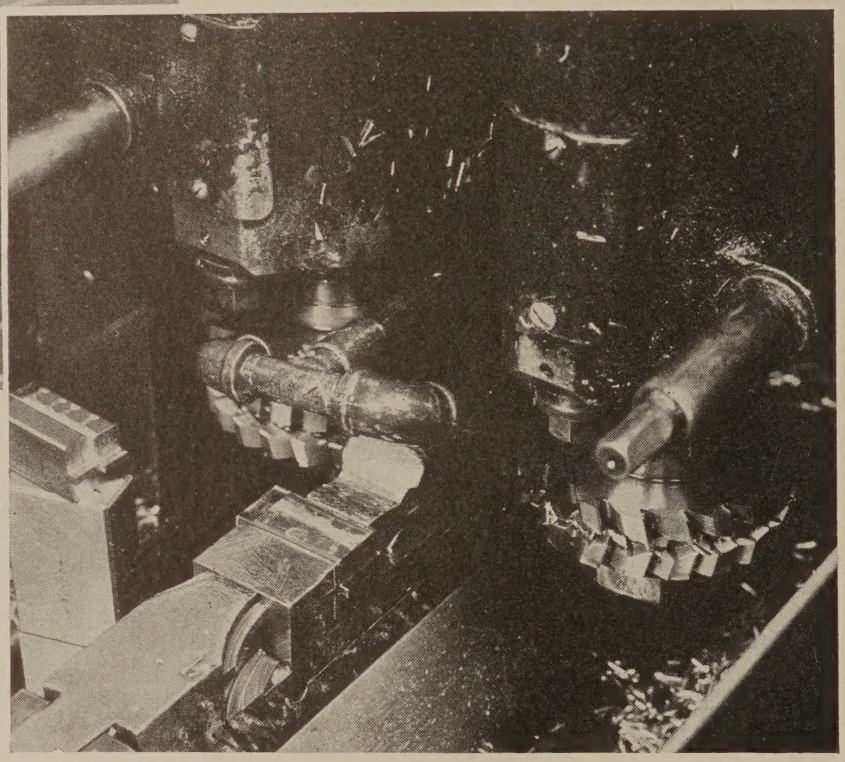
Milling Supercharger Bucket

By S. B. FUERST
General Electric Co., Fitchburg, Mass.



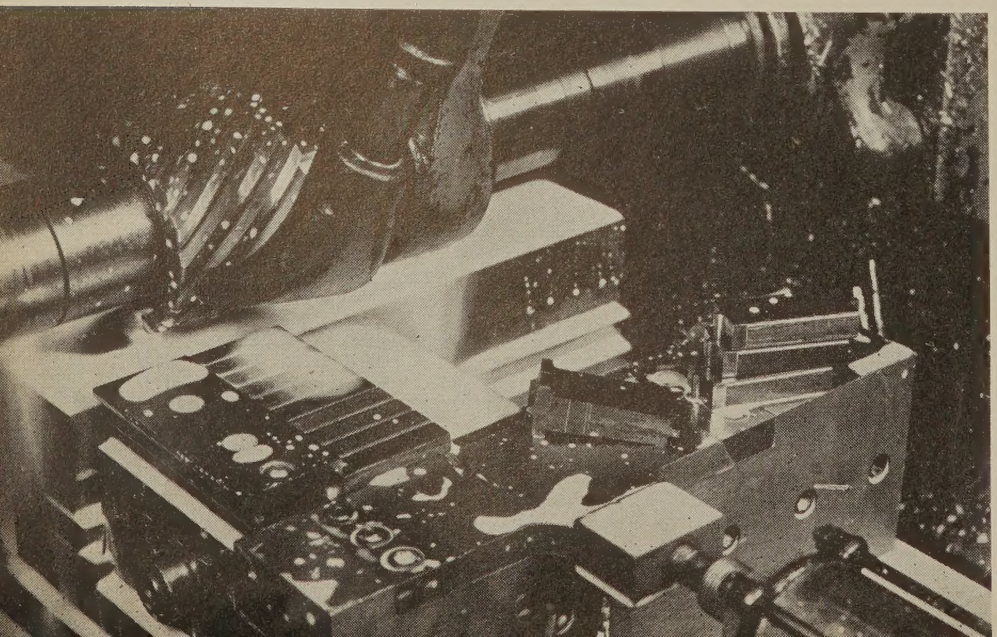
ABOVE

FIG. 1—Cold drawn bar stock in 20 ft lengths is sawed into bucket blanks. Approximately 125,000 buckets are sawed per year for superchargers.



RIGHT

FIG. 2—A vertical two spindle milling machine mills the tenon and weld preparation end. The weld preparation end is on the left hand spindle and tenon end on the right hand spindle in the picture.



o o o

LEFT

FIG. 3—In milling the tapered sides of the buckets, ten buckets are loaded simultaneously and milled on one side. They are then reversed and operation is repeated. The fixture was originally designed for 20 bucket loading and two cutter milling, but because of the necessity of identical pairing of cutters and excessive load on the machine, it was found that loading one side of the fixture only was more accurate and faster.

o o o

Blades From Bar Stock

Turbine bucket blades for diesel engine turbo-superchargers are milled from solid bar stock by General Electric Co. The manufacturing sequence, inspection methods, tolerances, and production speeds, as well as some of the unusual machine setups, are described by the author. Blades take about 20 min total machining time on standard machines.

THE specific requirements for turbine bucket blades for diesel engine superchargers are that they be designed for efficient operation, minimum weight and long life at operating temperatures from 1000° to 1200°F[1]. Minimum weight is required to reduce the inertia of the rotor of the supercharger so that it can follow the operation of the diesel engine with a minimum of lag. It is, therefore, a major factor in the selection of materials with a high endurance strength in the operating temperature range and in the tolerance requirements to produce the buckets.

Particular attention must be paid to the tolerance requirements of the blade sections, their relation to each other and the relation of the blade as a whole to the base. As the buckets are welded to the turbine disk or rotor, variations in the width or angle of the sides of the base will result in a weldment with buckets out of position radially with respect to the disk. A tolerance of ±¼° from the designed position is required to keep from overstressing the bucket edges.

[1] *The application and service conditions of the turbine buckets described in this article are shown in the article: "Producing Superchargers for Diesel Engines,"* THE IRON AGE, *Mar.* 15, 1948.

Finish also is important, not only from the efficiency gains but also to insure against transverse tool marks, especially on the bucket edges. These, in effect, are incipient cracks that may cause bucket failure.

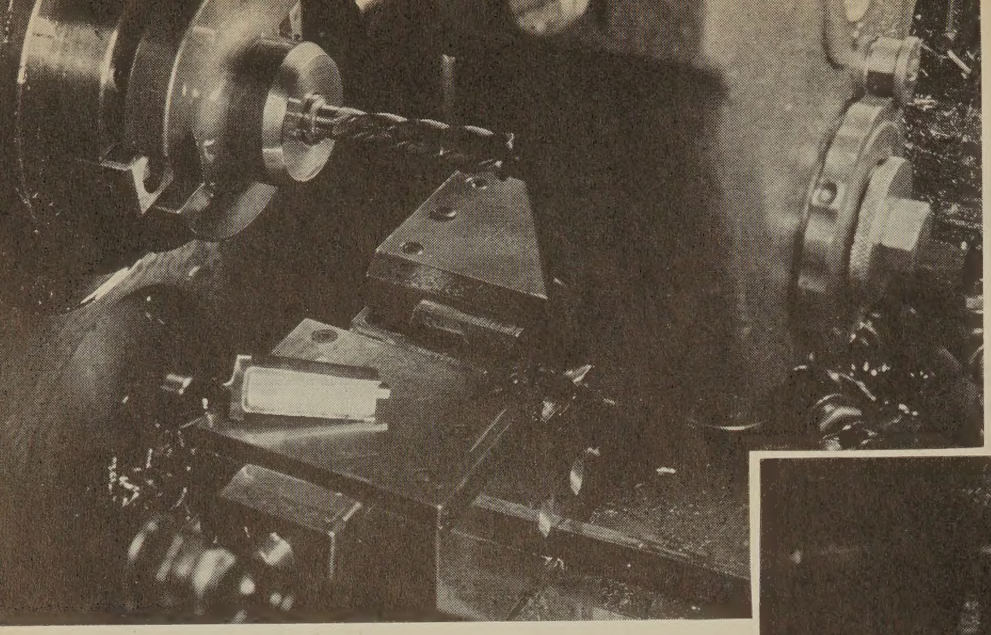
To meet these requirements in a competitive market in quantities that do not warrant special or single purpose machine tools, a machinable high temperature material is required. The material selected for this application is the 16-25-6 high temperature alloy, with a hardness of 22 to 30 Rc. Careful planning, utilizing equipment on hand, coupled with proper fixturing design and inspection gages to maintain repetitive precision buckets, required special cutting tool development and resulted in a bucket that has been satisfactory for the past three years.

Solid bar stock, cold drawn to precision width and thickness, 1.0625 (+0.010, −0.000) in. x 0.500 (+0.000, −0.010) in. in 20 ft lengths is transformed into turbo-supercharger buckets manufactured to precision tolerances in approximately 20 min per blade. A coupon from each lot of material received from the vendor is carefully tested before the lot is released to the factory for use.

The bars are automatically sawed to length in a circular sawing machine, as shown in fig. 1. Using a triple chip high speed steel circular saw, 8 in. diam x 0.080 in. wide with 70 teeth operated at 41 sfpm, pieces are sawed to length within ±0.005 in. tolerance in 28 sec. A rotary wire brush against saw blade keeps teeth free from chips during operation. Careful repetitive grinding on an automatic saw sharpener permits production of approximately 1000 pieces per regrind of saw. Pieces are spot-checked with a maximum and minimum length gage.

Previously, milling the tenon and weld preparation end was the fourth machining operation, but since obtaining the material cold drawn to closer tolerance and flatness, it has been possible to eliminate the milling of the four sides to width and thickness at a substantial labor and material saving.

Milling of the tenon and weld preparation end is done on a vertical two spindle milling machine as shown in fig. 2. Two buckets are loaded horizontally in a fixture and straddle milled to length.



LEFT

FIG. 4—Plunge milling the inside radius or scoop of the bucket is the most critical of all milling operations because of required accuracy and finish. The bucket must be free of all tool marks. In regrinding cutters, clearances must be consistently duplicated and the radius must be polished perfectly to eliminate tool marks in work.

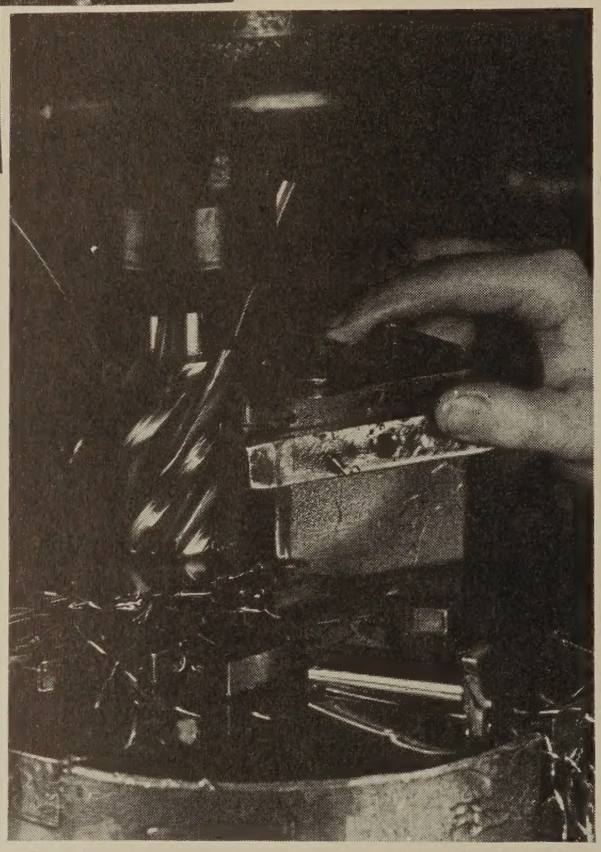


FIG. 5—Profiling the radius and angles on the back of the bucket is done on a vertical milling machine with an automatic turntable and a special cam-clamping fixture. Spindle speed is 151 rpm and feed is 1⅜ ipm.

The tenon end is milled on the bucket for two purposes. It provides a locating point for further machining operations and the necessary locating point for welding the bucket to wheel disk. Formed relieved milling cutters operated at 60 sfpm machine the weld preparation end on the second spindle. It is important that the width of weld preparation end and tenon end is held within a ±0.001 in. on center relationship, because subsequent operations require that this accuracy be maintained to pass inspection tests. Machining time is 1.75 min per bucket. A template gage is used for checking the width and form of weld preparation end. Go-and-No Go gages check the tenon end. A length snap gage checks the part from the bottom of weld preparation end to base of tenon. The bucket is then mounted on hardened blocks and indicator readings taken and, by reversing the bucket, on-center location checked.

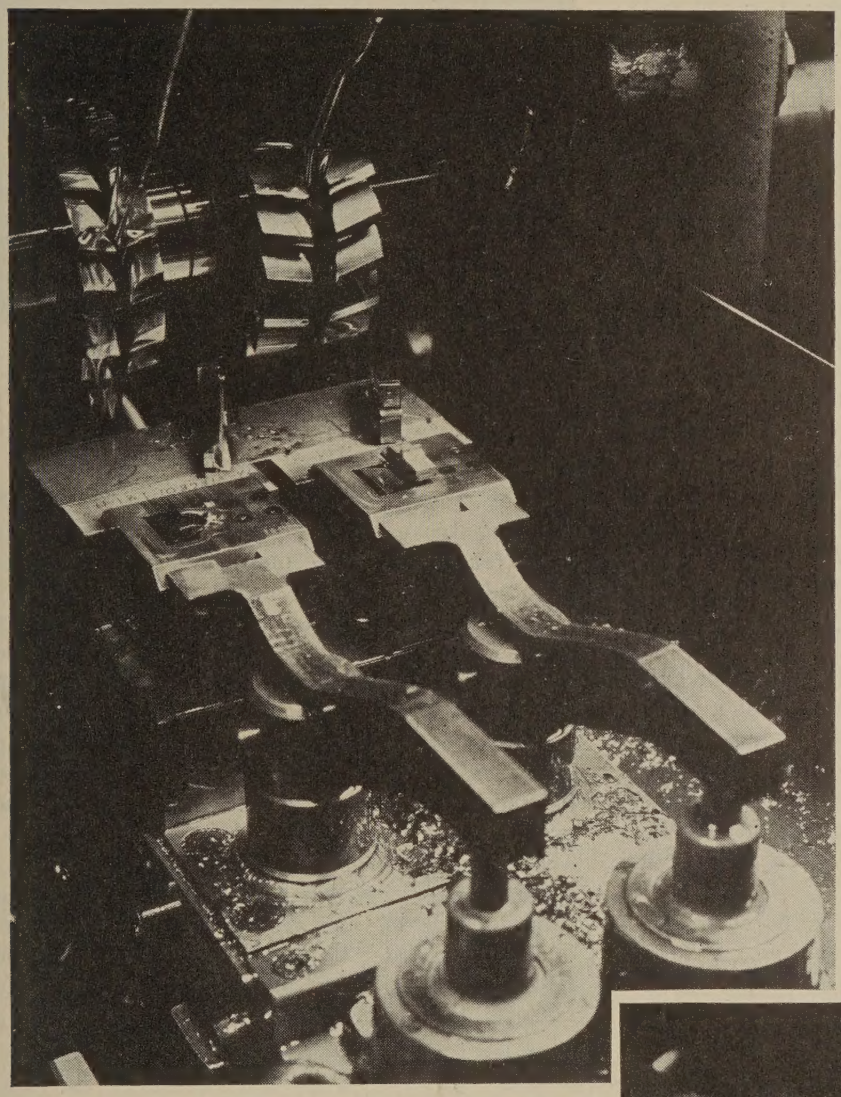
Sides of the buckets are then taper milled. Locating on the previously milled weld preparation and tenon end, 10 buckets are loaded in a rigid, air-clamping milling fixture, as shown in fig. 3. A 5-in. diam tapered slab milling cutter, rotating at 92 rpm, climb cutting, removes one side of these buckets in 5 min. The opposite side is milled by reversing the bucket, locating it on the same fits, and repeating the process. Machining time is 1 min per bucket. This operation must be accurately held since the tapered sides become the exit and entrance edge of the bucket, although less than 0.030 in. remains in the finished state. By locating the bucket on the newly milled tapered side, a dial indicator gage checking fixture visually checks the locations of the tenon and weld preparation ends. The bucket is reversed and indicator readings are duplicated. This check reflects any errors on previous operations and stresses the importance of maintaining center relationship.

The fourth operation is plunge-milling the inside radius or scoop of the bucket. Milling operations to this point are fairly simple and straight forward. In this plunge-milling operation, shown in fig. 4, both accuracy and finish are of primary concern. Because the inside radius is similar to the frustrum of a cone with the base toward the weld preparation end, it was necessary to design a tapered end-mill that had the large diameter at the outer end of the cutter because of impossibility of milling clearance on the shank end. The stringy nature of the material, lack of chip room and finish requirements also made it impractical to plunge-mill two buckets at a time. A standard horizontal milling machine is used.

The bucket is located on the tenon and weld preparation end and clamped on the sides by a dual air-operated fixture. The table is plunged vertically upward with a ⅝ in. feed into the tapered end-mill, which revolves at 281 rpm. Considerable development was necessary in cutter design; and types of high speed steel for the cutter and cutting clearances were critical problems because of the required finish and cutter life. Since the finished cut must be free from any tool

marks or chatter, it was apparent why this operation proved a major obstacle. Machining time is 1 min per bucket.

The bucket is carefully inspected in a box-gate gage. It is then located on tenon and weld preparation end and convex radius gates check known cross sections. A zero indicator reading lengthwise on the bottom of the scoop indicates correct taper of the inside radius in relation to the back, since the gage is designed to tilt the bucket to horizontal level. The location of the bottom of the scoop to the end of weld preparation end is checked with a micrometer. The edges and tenon are burred prior to the next operation of profiling the radius and angles on the back of the buckled vertical milling machine. A post fixture mounted on an automatic turntable is used, as shown in fig. 5. The bucket is cam-clamped and centered by the weld preparation and tenon end and the nesting scoop on a radius block mounted on a post. The back of the bucket is also similar to the frustrum of a cone; but is blended tangentially to flat planes on each side at 30° and 35° angles, respectively, and tapered with relation to the axis of the scoop. More favorable milling conditions resulted in the use of a tapered end-mill run at 151 rpm at a feed of 1⅜ ipm. The traverse table feed moves the work into the cutter at the proper angle until the rotary table picks up at the radius on back and rotates through a 115° arc, and then stops as machine traverse feed continues to complete the cycle. Machining time is 1.5 min per bucket. The bucket is checked in a V gage, which locates on known sections in back of the bucket and registers on the weld preparation end. A zero indicator reading lengthwise on bottom of the scoop indicates the proper taper of the back of the



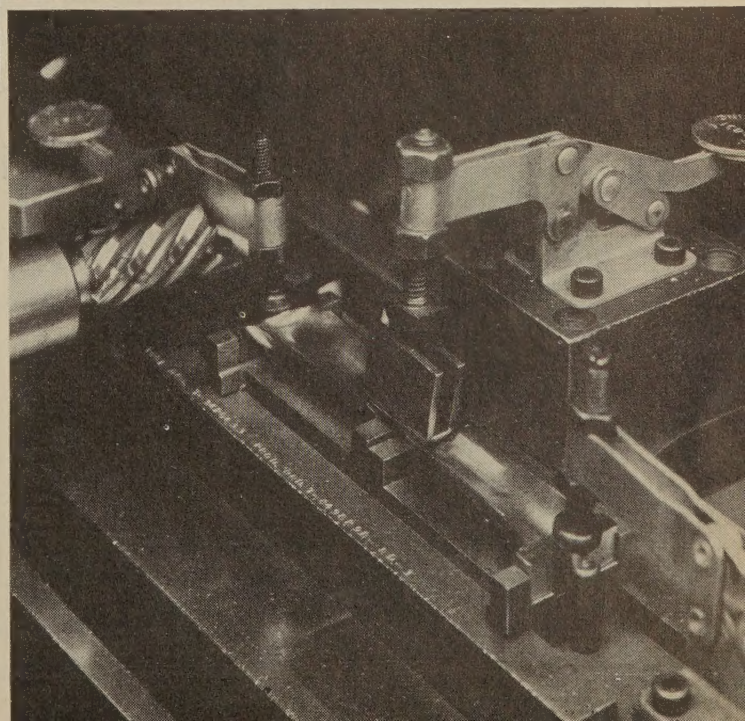
LEFT

FIG. 6—In milling the taper and square tenon, a three fixture setup is used. The third block, not shown, is loaded with a bucket while milling progresses on the other two. As one block is removed the third block is ready for the fixture.

o o o

BELOW

FIG. 7—Using a hand miller, the admission side flat of one bucket and the exhaust side flats of another are machined on one cutter pass. Buckets are tipped in the fixture at proper angles for machining.



bucket with relation to the scoop. A gage with hardened locating buttons checks the weld preparation height. The bottom of the scoop is then polished. All tool marks must be removed or the bucket is scrapped. At this stage the component has taken on the appearance of a bucket and is ready for the next important operation of milling the taper on the weld preparation end.

To assemble 108 buckets around the periphery of the wheel disk, special care must be taken in milling the taper on the weld preparation end and squaring tenon. A tolerance of ±0.0005 in. is allowed on this operation, but an average must be maintained when assembling buckets in the assembly fixture prior to welding. A two-station fixture, which air-clamps hardened and ground locating blocks and sets of weld preparation and tenon cutters on the same arbor, progressively mills the weld preparation and tenon end of the bucket, as shown in fig. 6. The workpiece is nested on V blocks, locating on angles on back of the bucket. Since the bucket projects from either end of the block, it may be turned upside down in order to mill both ends of the bucket, one completed bucket on each pass of the cutters. The 5 in. diam cutters machine at 94 sfpm at a feed of 3 ipm. Machining time per bucket is 1 min. A micrometer taper gage checks the angle and the thickness of the taper. A flute gage, locating on the taper, checks the lean of buckets by use of projecting flush points that locate on vital known points on the back of the bucket.

A hand miller is used to mill admission and exhaust side flats, milling two buckets at a time, the admission side of one and exhaust side of the other. This is shown in fig. 7. The buckets are tipped to the proper angles by the fixture so that milling is possible with one pass of the cutter. The buckets are inspected for height by a flute gage mounted on a surface plate.

The buckets are now ready for grinding a 1 in. radius on the admission and exhaust edges. This is done on a surface grinder, as shown in fig. 8. The 1 in. radius is formed on the wheel and quickly ground into the edges with a few reciprocating strokes. Buckets next go to the polishing room for polishing the inside and outside of the vane section and radius edges. The buckets are then drilled for the tie-wire. This 0.094 in. diam hole is put through the center of vane section about ⅜ in. below the tenon end of the bucket. The tie-wire is a dampener to prevent excessive vibration of the buckets, which may result in bucket failure during operation. This hole is then deburred and polished, and buckets are degreased prior to final inspection.

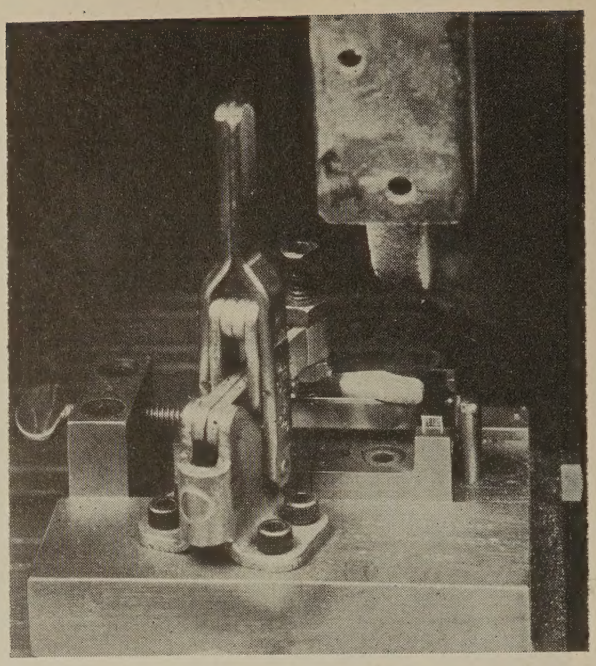


FIG. 8—The 1 in. radius on the front of the admission and exhaust edges of the bucket are ground with a surface grinder.

Because of the progressive nature of manufacturing this bucket, whereby each milling operation depends on the accuracy of the previous operation in order to pass inspection, it has been possible to keep scrap buckets at 8 pct of total buckets manufactured.

New Electrolytic Tinning Bath Studied

AN electrolytic tinning bath which has promised, on the basis of laboratory trials, to provide a wider range of workable current densities than has previously been available, is under development according to a report of the Tin Research Institute. This bath has not yet reached the stage of commercial trials, but if equally successful on a large scale it will facilitate the production of electrolytic tin plate with thicker coatings on existing electrolytic lines.

Touching on speculum plate, the report said that an electroplated coating containing about 42 pct Sn and 58 pct Cu is being increasingly used for finishing many articles used in the home. The advantages of this coating were listed as a good appearance, resistance to wear and freedom from tarnishing.

Full advantage of this coating cannot be realized, the report stated, until it is possible to make available parts with a bright finish, that is, one that requires practically no hand finishing. Work has been proceeding on the problem of bright speculum plating and it can now be done under laboratory conditions. However at present the process requires closer control than can be exercised in a production plant.

Welding Compressor Shells

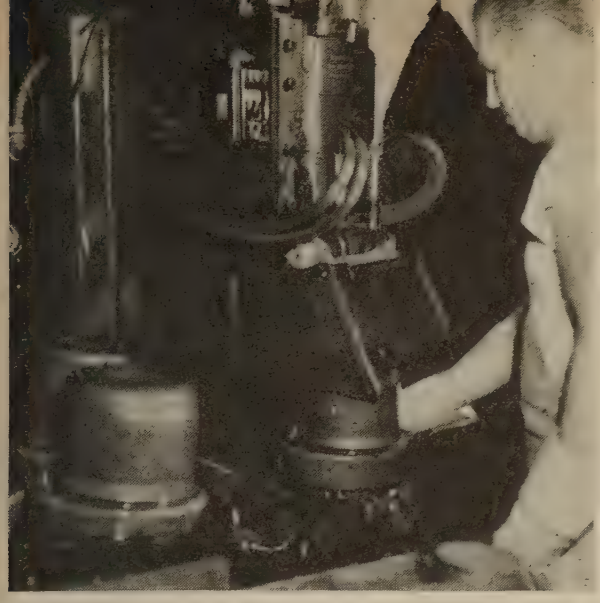


FIG. 1—Shells come from cleaning on gravity roller conveyer, left, to spotwelder where sound-deadening disks are placed and welded.

FIG. 2—Between two roll spotwelding machines a roller conveyer brings shells to an operator running both machines. He fits cooling fins onto shells, places the assembly in the machine and the welding is completed.

THE extensive use of resistance and automatic arcwelding methods has simplified the mass assembly of refrigerator compressor shells, into which go the compressor and motor, at the Westinghouse Electric Corp., East Springfield, Mass. Conveyerization of shells between welding stations and machines also aids materially in speeding fabrication.

SAE 1010 deep drawing stock comes to the battery of presses in disk form and after several drawing operations, the shell has an 8½ in. OD at its open end, and several inches deeper goes to 6¼ in. OD. On a gravity roller conveyer, these drawn shells proceed to a projection welder.

The shell is placed on a horn that incorporates a single-purpose fixture. Three terminal bushings, spring-loaded in the fixture, are welded to the shell. The bushings provide for the passage of power lines to the compressor motor, and accuracy in welding them is obtained with a fully synchronous weld timer with a phase-shift heat control. This control holds the amount of restriction on a terminal bushing bore, a screw-machine product, while it is being welded. Since typical free-machining steels might contain too much sulfur and cause trouble in welding, the bushings are made of special machining steel.

Electrode pressure is 2000 lb during this operation, and the welding time is about 6 sec at 30,000 amp and 9 cycles for three bushings.

When the shell is removed from the horn, it is placed on an inclined belt conveyer that carries it to a gravity roller conveyer and hence to a washing machine. The shells are placed on horns on a chain-type conveyer for travel through the washing machine for removal of all drawing lubricants. As the shells leave the washer, they receive a coating of light, rust preventative oil.

After washing, the shells are transferred to a roller conveyer to be carried to a bank of resistance welding machines for: (1) spotwelding of sound dampening disks, (2) roll spotwelding, on 1½ in. centers, of cooling fins, (3) spotwelding of the thermostat plate, and (4) projection welding of the mounting brackets.

Compressor shells used in heavier service required two sound dampening disks, in which case the two disks are joined with a free spotweld before being welded to the shell. Shells go into a horn on this dampening disk welder that permits indexing the part 120° to allow three welding positions, with two welds at each position. This welding operation is shown in fig. 1. Electrodes are spring-loaded to permit equalization of pressure on both spots. Pressure on the two electrodes is 500 lb, at 18,000 amp and 6 cycles.

A roller conveyer then transfers the shells to a battery of four roll spot welders for welding to the compressor shell the cooling fins. One operator handles two welding machines, welding 0.031 in. thick fins to the exterior of the shell. With the shell placed on a mandrel with the fins held in place by a circular clip, the seam welding shell lowers into place and makes the weld, as shown in fig. 2.

As the welding is finished, the upper electrode wheel is 0.030 in. closer to the mandrel than at the start of the weld. This inward movement of the welding head actuates a Micro-Switch connected with an interlocking switch on the welder and the wheel is raised, releasing the shell. Welding wheel speed is about 180 ipm, current is about 20,000 amp, wheel pressure is about 600 lb and it takes about 1 min to complete the operation.

The thermostat plate is next placed on the shell. A small fixture locates the plate with the aid of a hole in the shell, and two spots weld

(CONTINUED ON PAGE 70)

Ultrasonic Testing of

Exacting requirements in aircraft construction have made parts inspection increasingly critical. Ultrasonic equipment—able to measure thickness when only one side of the material is accessible and to detect and locate subsurface flaws — has proved invaluable in much of this inspection work. Details of the practical work done at one plant, including some interesting variations on ultrasonic equipment usage, are given.

ABOVE

FIG. 1 — Sonizon being used to check exhaust tube for thin spots caused by burnout. A direct reading of wall gage is obtained.

o o o

FIG. 2—First-run parts, such as the drawn tank end shown, are tested to check thinning in critical areas.

o o o

Aircraft Components • • •

By WILLIAM C. HITT
Assistant Chief Inspector,
Douglas Aircraft Co., Inc.,
Santa Monica, Calif.

As speed and load factors in aircraft construction have become more critical, the requirements for quality and inspection have become correspondingly more exacting. One phase of testing work involves the use of ultrasonic equipment[1] to measure thickness when only one side of the part is accessible and to locate subsurface defects such as porosity, laminations, pockets, forging cracks, lack of bond and loss of material from wear or corrosion.

The Sonizon, an ultrasonic instrument made by Magnaflux Corp., Chicago, meets most of these requirements and is being used to gage both ferrous and nonferrous parts and materials in thicknesses of 0. 015 to 0.500 in., with a working accuracy of 2 pct of the part thickness.

With the instrument, thickness is read directly on calibrated plexiglass gage sheets supplied with the unit. When used to measure parts having a cross-section greater than 0.500 in., it is necessary to use harmonic readings, applying a simple mathematical formula.

The Sonizon is portable and operates on 60-cycle, 115-v current. The cathode ray tube and other delicate parts are shock-mounted. Operator training time compares favorably with that required to train a Rockwell hardness tester.

The Sonizon scale is marked off to read directly in thickness across the face of the cathode ray tube, as shown in fig. 1. When the crystal probe is held against the surface of a part, a sharp peak or pip immediately appears on the line across the tube. Location of this peak gives a direct reading of either the part thickness or the depth of any defect. Height of the peak is adjustable and has no significance as to thickness of the object.

A number of harmonic peaks appear with materials as thick as 3 or 4 in. For such pieces, two readings are taken and thickness is obtained by a simple calculation.

[1] *See "Supersonic Measurement of Metal Thickness" by W. S. Erwin,* THE IRON AGE, *Nov. 9, 1944.—Ed.*

o o o

FIG. 3 — Fuselage skin gage being checked. Portability of the instrument and nondestructive nature of the test make installed-components checks practical.

o o o

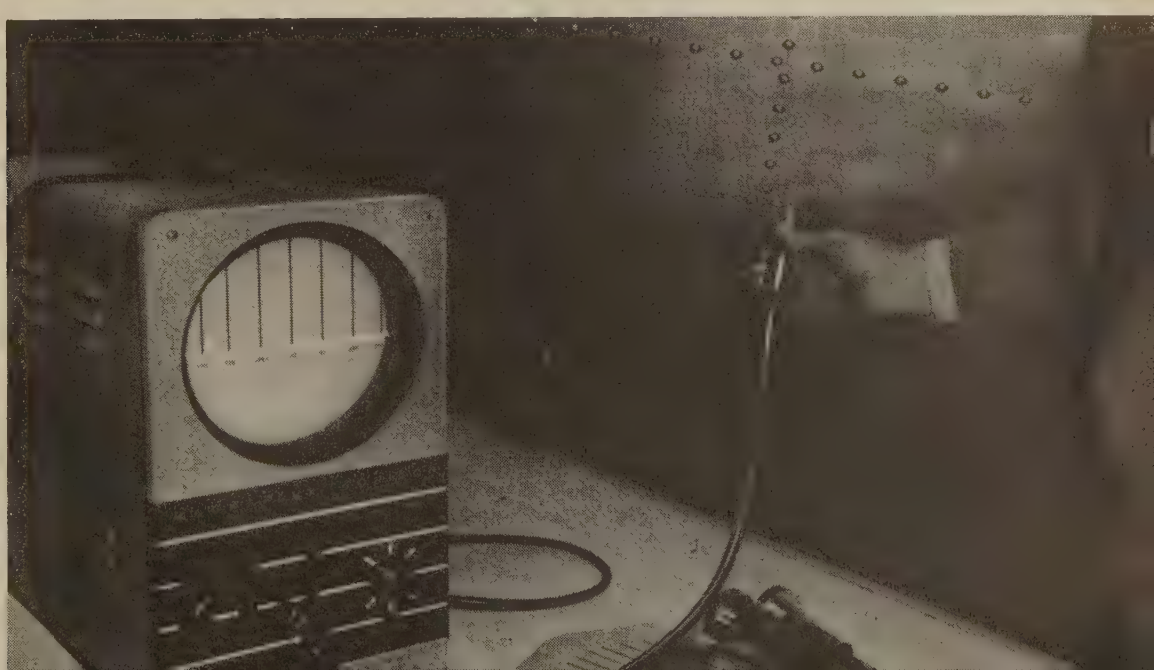


FIG. 4—Testing rolled plate stock for laminations. Harmonic peaks disappear or drop close to the horizontal line when the crystal passes over a lamination or subsurface defect.

o o o

FIG. 5—Blind ID dimensions of tubular sections, such as the landing gear truss shown, can be checked for loss of material by corrosion.

The Sonizon is suited for measuring thickness from one side only. However, even if both sides of a sample are open to the micrometer, use of the Sonizon is frequently much more rapid, readings being made as quickly as the probe can be moved over the surface.

In operation, a constantly changing range of high frequencies is fed to a quartz crystal in the hand probe. These electrical impulses are transformed to sound waves which travel to the opposite face of the material and are reflected back. When particular sound waves hit the opposite face of the material and are reflected back to arrive at the same instant the next waves are leaving, an energy change is reflected into the electronic circuits. This change is then amplified and causes the peak to appear as the correct thickness indication. Thus a reading is obtained corresponding to the ultrasonic frequency which is resonant through the piece under test.

The instrument scale is laid out to read directly in thickness of the material (steel, aluminum, magnesium, etc.) under test, and has been determined by this relationship:

$$\text{Thickness (in.)} = \tfrac{1}{2} \times \frac{\text{Sound Velocity (in. per sec)}}{\text{Frequency (cycles per sec)}}$$

When the Sonizon is used to determine thickness of materials, 2-to-1 scales are used. That is, thickness indicated by a pip at the upper end is twice the thickness indicated by a pip at the lower end. For many production purposes, only one or two scales are required on the instrument to cover the thicknesses regularly being measured. However, a general purpose Sonizon may have up to five ranges.

In routine laboratory work, the instrument might be called on to read thickness or locate defects over a wide thickness range and possibly on many materials. Typical ranges established could then be: 0.014 to 0.028; 0.025 to 0.050; 0.045 to 0.090; 0.080 to 0.160; and 0.150 to 0.300 in. Any similar 2-to-1 ranges can be set up for direct reading of other values between 0.010 and 0.500 in.

Although degree of roughness affects the ability to obtain readings, a reading, if obtained, is accurate. Excellent results can usually be obtained on surprisingly rough or scaly surfaces. For example, the scale on hot-rolled or hot-pierced tubing does not affect accuracy.

For best results, however, both front and back surfaces should be moderately smooth—such as rough machined or good cast faces. The Sonizon will operate on any material of moderately good sound-conducting characteristics; but, since it depends on sound conduction, very absorbent materials, such as paper and wood, cannot be tested.

The scale of a general purpose instrument is usually calibrated for steel. This scale cannot be used for direct reading of other materials as each material has a different characteristic speed of sound, and location of the peak is dependent upon this speed.

If other materials, such as nonferrous metals, are to be regularly tested, additional scales can be made for the same instrument. Each will read directly for one material. However, it is possible to use one scale for any number of materials by

multiplying the scale reading by the ratio of sound speed in the material for which the scale is calibrated to the sound speed in the material under test.

Fig. 1 illustrates a typical case in which the Sonizon is used to determine the acceptability of exhaust tubes during routine overhaul. By moving the crystal over the surfaces of the tube, a direct reading of wall gage is obtained and thin spots, where there has been loss of material by burnout, are readily found. The standard flat crystal, in the thickness range from 0.014 to 0.050 in., works satisfactorily on tubes of 1 in. diam and larger. Readings taken on stainless steel require a correction of 0.004 to 0.005 minus when read on the steel scale.

Scales can be made for direct reading eliminating the possibility of operator error. The use of a Sonizon in this application makes obsolete the hammer test or drilling and rewelding.

In fig. 2, the operator is testing for wall gage in the center of a drawn tank end. Use in such applications, for first-run parts off the drop-hammer and hydraulic press, are valuable, as tests to control thinning in critical areas save both time and money.

It should be noted that the part in fig. 2 has a relatively rough surface as drawn and that the only preparation for the Sonizon test was wire brushing to remove scale and carbon. Sonizon readings of 0.192 at the edge and 0.187 in. at the center of the draw were obtained. A generous application of mineral oil assisted in giving a very clear reading of wall thickness variation from the center to the outer edges.

Problems often arise in which it is necessary to check the gage of material installed on an aircraft structure. These tests must of necessity be nondestructive and economically practical. The use of the Sonizon as illustrated in fig. 3 shows how this is accomplished. The fuselage skin in the illustration measures 0.032 in. This method eliminates the necessity for removing rivets, structure members, liners, and for carrying out other operations which would be required for conventional inspection.

Fig. 4 illustrates the use of Sonizon as a means of testing rolled plate stock for laminations. It is noted that the operator is using the number one range to provide a harmonic pattern that is easily read. The arrangement of the harmonic peaks disappear or drop close to the horizontal line when the crystal passes over a lamination or subsurface defect.

This illustration may be used to demonstrate the harmonic method of calculating thickness and is used when the gage of material is greater than 0.300 in. The equation applicable is:

$$T = \frac{R \times r}{R - r} \times N$$

where R is the peak on the right side of the tube, r is the peak on the left side of the tube, and N is the number of valleys or spaces between the harmonic peaks.

Applying the reading obtained with the piece in fig. 4,

$$T = \frac{0.087 \times 0.048}{0.087 - 0.048} \times 6 = 0.642 \text{ in.}$$

At the time of aircraft overhaul a variety of problems arise requiring considerable ingenuity to answer. Among these problems are wear tolerances, corrosion and fatigue. Units such as landing gears and motor mounts fabricated from welded tubular members are susceptible to loss of

FIG. 6—Machined cast magnesium cone being checked for taper dimension.

material by corrosion. The OD tolerances can be measured by calipers and micrometer, but blind ID dimensions are something else.

The Sonizon can check the majority of these conditions. Fig. 5 shows this test being accomplished on a DC-3 landing gear upper truss. When checking tubular sections, it has been found convenient to test the reading against a similar contour of known dimension. The operator, as shown, is using the range from 0.045 to 0.09 in. with a flat crystal.

One of the best adaptations of sonic equipment is its application to taper dimensional control. Fig. 6 illustrates this operation on a machined cast magnesium cone. The scale reads 0.300 in.

The Sonizon has been used as a dimensional control on spun parts and some experimental work has been done on coordinating the Sonizon to spinning lathe operation. It is hoped that this can be perfected so that the operator can control metal thickness during spinning.

For close tolerance dimensional testing, sets of test blocks in gages from 0.015 to 0.300 in. are kept with the machine. These blocks are fabricated from steel, aluminum, stainless steel, magnesium and brass.

The device has also been used to advantage in testing lack of bond between silver bearing material brazed to steel connecting rods. The purpose of this application is to locate and eliminate local points of poor bond to insure reliability of service. At a point of poor bond, a clear single peak reading gives the thickness of the silver alone over voids of no bond. Curved crystals are used in this application.

Successful application has been made in locating lack of bond between hard facing and steel supports on cutting tools.

A unique means of determining dimensional tolerances affected by core shifts in castings is provided by the Sonizon. Using convex crystals, excellent results are obtained even with difficult materials such as cast iron which has a high internal clamping effect.

Oxygen Enrichment in the Low-Shaft Furnace

RECENT investigations in Trostberg, Bavaria, have shown that in a small low-shaft furnace, a basic pig iron of normal analysis can be produced without difficulty, using an oxygen-enriched blast. A high-carbon ferrochrome has also been produced with an 80 pct oxygen blast, according to data presented in the *Iron and Coal Trades Review*, May 20, 1949.

As indicated in the report, oxygen enrichment will not of itself effect a saving in useful heat. In the blast furnace, it will only bring about a saving in heat and consequently a reduction in coke rate if, owing to the enrichment, either the top temperature is lowered or the burden is increased, thereby raising the operating efficiency of the furnace.

Thus oxygen-enrichment is particularly applicable to blast furnace production of ferroalloys where normally the top gas temperature is very high. If, however, the blast is enriched more than is necessary to reduce the top temperature to 250°F, or thereabouts, the coke combustion rate must be increased to make up for the loss of sensible heat entering the tuyeres due to the reduction in volume of the enriched blast.

Blast furnace smelting, with or without such oxygen additions, however, will remain economical as long as there are available quantities of suitable ore and coke. If a costly form of pretreatment is necessary to render the ore and fuel suitable for smelting, it becomes practicable to consider oxygen enrichment in the low-shaft furnace.

Welding Compressor Shells

(CONTINUED FROM PAGE 65)

the plate to the shell. Pressure is 1000 lb, and power is about 18,000 amp.

Each shell has two mounting brackets, each 0.125 in. thick. A special pneumatically operated fixture is used to position the brackets one at a time during welding. The operator kicks a pedal to index the shell 180° and position it.

The brackets are welded at 20 cycles at about 35,000 amp, and the electrodes are spring loaded. After bracket welding, the assemblies are inspected and delivered to a battery of brazing stations. A suction tube and a strainer are brazed to each shell, using ETX silver solder, a neutral flux, and oxyacetylene torches. The welded assemblies are then washed, prior to assembly with motor and compressor units. Electrical connections are soldered as the shells travel along a roller conveyer during assembly.

Domes or heads are forced into the shells against four button projections, and the whole unit is hermetically sealed by automatic arc-welding machines, using a light, shielded arc. The discharge tube is then brazed to the shell, and the entire assembly is tested.

Forging Crankshafts One Throw at a Time

The RR method of forging crankshafts, in which one throw at a time is formed, utilizes rolled or forged bar stock. The operation involves one stroke of the press to upset the webs and displace the metal forming the pin. The use of smaller ingots, less machining, uninterrupted grain flow throughout the length of the shaft and adaptability of equipment to a variety of crankshaft sizes are some of the advantages claimed.

By H. MALCOR
Chief Engineer,
Cie des Forges & Aciéries de la Marine, Paris

THE RR method of producing crankshafts involves forging one throw at a time from a rolled or forged bar, and was developed and is in use at the St. Chamond, Loire (France) plant of the Compagnie des Forges et Acieries de la Marine. The process is applicable to crankshafts having any number of throws and yields highly accurate throws in correct angular relationship with each other. The size of the crankshaft is limited only by the capacity and daylight opening of the press.

The forging operation involves one stroke of the press to make a complete throw out of a cylindrical bar. Fig. 1 shows in outline how the bar is forged. By upsetting, fig. 1B, two bulges are made in the bar, each corresponding to a web with a length between them corresponding to the pin. By combined stretching, bending and further upsetting, fig. 1C, the pin is brought to correct position. Further upsetting, fig. 1D, brings the webs to desired thickness. In this forging process the bar is simultaneously bent to form the crank and upset to form the webs, resulting in the axis of the ingot being always near the center of each section so that the surface layers of the crank pins, journals and webs are produced from the sound material of the outer layers of the original bar with a continuous grain flow. While the equipment used in the forging of these shafts is operated hydraulically, it is not an integral part of the press itself. It can be used under any forging press having the necessary power, headroom and working stroke.

The lower portion of the machine consists of a bed plate, detail I in fig. 2, which may be withdrawn as required from below the press by means of an ordinary drawback gear. The upper surface of this bedplate is machined to form guides for the two sliding members, A, referred to as cradles. These carry the lower halves, O, of the dies for gripping the crank journals and one of them carries a lower half die that positions the last formed crank throw at the correct distance and angular relationship to the one about to be formed. The upper faces of the cradles, A, and the lower faces of tool cradles, B, are formed as mating sliding ramps, R. The upper tool, B, is attached to the moving crosshead of the press. It also carries the upper halves, O′, of the respective dies with means of locking them into position by the use of auxiliary hydraulic cylinders, F.

The cradles are fitted with drawback cylinders so that they may be returned to their initial position at the end of the working stroke. Drawback cylinders are also provided in the top tool for releasing the top halves of the dies.

At the center of the bedplate there is a vertical hydraulic cylinder, F′, which carries an anvil, E. This forms the lower half of the holder for the crank pin. This hydraulic cylinder exhausts through a spring loaded valve and the stroke of its ram can be preset to determine the throw of the crankshaft. Thus, when the throw is being

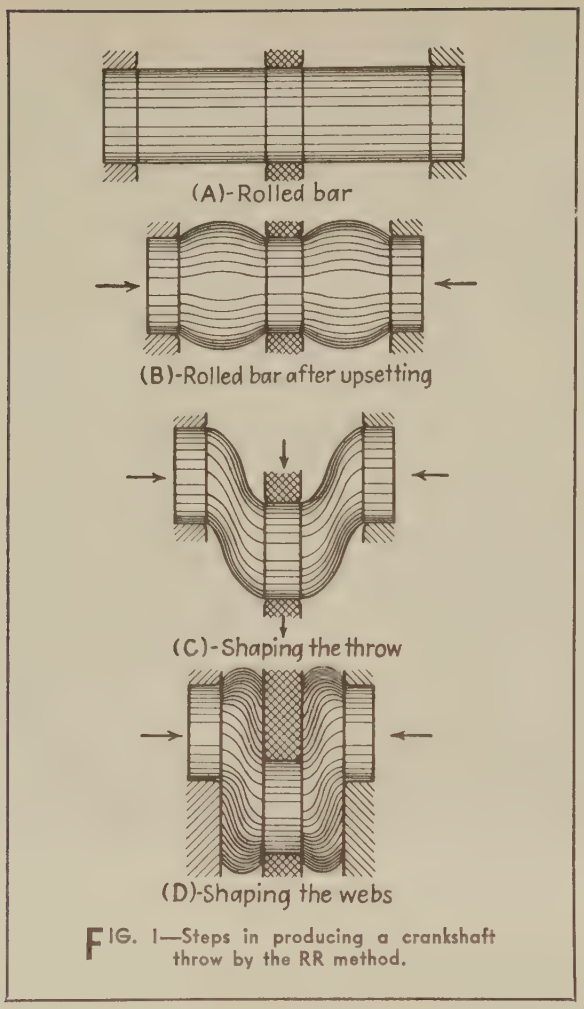


FIG. 1—Steps in producing a crankshaft throw by the RR method.

formed, the anvil moves downward against constant resistance until the ram comes to the stops. The upper half crank pin holder or gripper, P, is actuated by the top tool, B. If the machine is of the type in which the upsetting move of fig. 1B is not performed, the gripper is rigidly attached to the top tool. In the case of a machine adapted to upset the material for the crank webs, this gripper is mounted on the ram of a hydraulic cylinder, D, the stroke of which may be adjusted to determine the amount of upsetting to be done. Thus, as the top tool descends and commences upsetting, the ram carrying the gripper, P, is forced back into its cylinder, D. Provided all adjustments on the machine have been correctly made, the ram will come against the stops at the instant that the correct amount of the material to form the webs has been upset, and, as the downward stroke of the press continues, the gripper moves downward against the resistance of the lower cylinder, F', forcing the crank pin down to the correct throw.

If the anvil and gripper are removed from the machine, it may be used for upsetting flanges on shafts by the use of special dies in the cradles, set to make the required stroke.

Although the machine normally forms crank webs of elliptical form, it is possible, by the use of suitable closed dies, to form crank webs that are approximately circular in outline.

To produce a crankshaft, the cradles and various auxiliary cylinders are adjusted to give the movement required for the particular crankshaft to be made. A very large proportion of crankshafts have a flange at one end, and when this is the case the flange is formed first, serving as a locating point for the correct positioning, lengthways, of the first crank throw. To form this flange the machine is set up with the anvil and gripper removed and the appropriate dies assembled in the cradle.

While the various tools are being adjusted to suit the formation of the crank throws required, the flanged bar is reheated. The press crosshead is then taken to the top of its stroke and the forged bar threaded into the lower dies, located endways by the flange. The top tool then comes down until the gripper engages with the crank pin area and the top halves of the journal dies grip tightly on the shaft. The downward stroke of the press forces the tool grips inwards, thereby upsetting the material for the crank webs. At the appropriate moment on the downward stroke, the gripper cylinder having been correctly preset, it functions by pushing the crank pin gripper with its supporting piston, the cradles meanwhile continuing their simultaneous inward movement. The various strokes having been made, the inward movement of the cradle stops when the crank webs are of the correct thickness, and at the same time the anvil and the gripper have moved downwards the correct distance, completing the formation of the crank throw.

While the various movements have been described separately, they function simultaneously. The downward stroke being completed, the press cylinder immediately raises, having formed one complete throw of the crankshaft. The shaft is lifted out and repositioned in the lower dies again, this time the crank pin just formed is also gripped in correct alignment to the second crank to be formed and the operation is repeated.

Dies Depend on Throw Angles

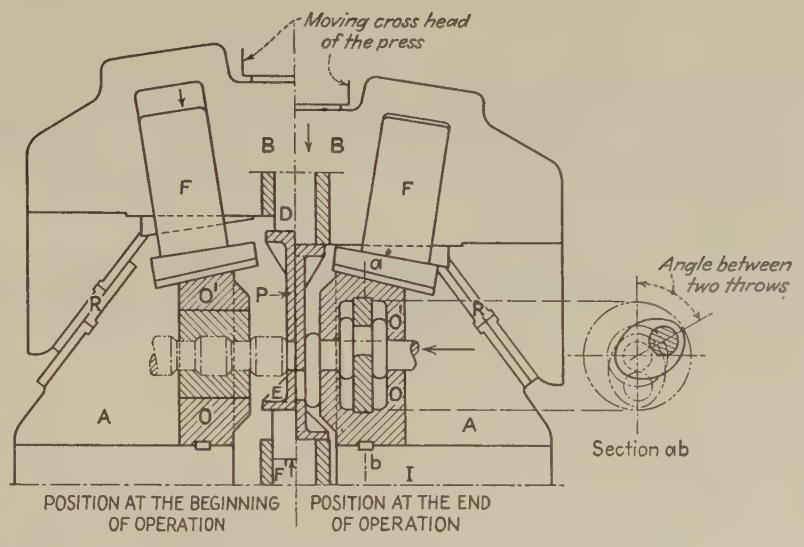
In practice it rarely happens that more than two throws can be formed on one heating since it is necessary to change the dies that grip the preformed crank throw unless the angular relationship of the third throw to the second is the same as that of the second throw to the first, both in magnitude and hand. Cases may arise, however, when the particular angular relationship of the cranks adopted by the designer makes it possible, in theory, to form three or even four crank throws in succession. The limiting factor is then the loss of heat in the bar and if the speed of operation and manipulation is fast enough, there is no reason why three or four cranks should not be formed in one heating.

On the machine originally used at St. Chamond, the crankshafts were formed from bar machined all over with portions of enlarged diameter to form the crank webs. Thus there was no upsetting as in fig 1B. This had the disadvantage that the grain flow was not continuous. On the other hand, for large crankshafts it meant that a press

o o o

FIG. 2—Details of the RR crankshaft forging machine are shown here with the machine in both opened and closed positions.

o o o



might be used having appreciably less head room and working stroke, while the apparatus itself was much smaller in size and weight than it would have to be to accommodate the upsetting operation. For this reason, this method is still occasionally used.

An advantage of this process is that there is a great saving of steel since the initial forging is simply a rolled or forged round bar. It is possible to use an ingot of smaller section and still maintain a satisfactory forging reduction. For example, a crankshaft weighing 7 tons, No. 12 in table I, requires an ingot of 19 tons instead of 38 tons. Typical data on crankshafts formed by this method are shown in table I. Furthermore, the process of twisting the various crank throws to their correct angles is eliminated entirely.

EDITOR'S NOTE—*An interesting observation made by American engineers is that the RR process may have merit from the standpoint of freedom from segregation and superior grain flow over very large crankshafts, but there is considerable doubt that the process would have much general use in this country. It is felt that the method does not compare with drop forged crankshafts and its only application would appear to be in replacing blacksmith hammer or hydraulic press forgings too large for drop forging.*

Savings are evident as regards machining. The normal operation of gapping is eliminated, and there is less material to remove even if the crankshaft has to be machined all over. The aforesaid type of crankshaft requires 13 short tons instead of the 20 tons of steel used by the normal process. The machining time is cut by 60 pct. In many cases of crankshafts for slow running engines, it is feasible to leave the periphery of the crank webs unmachined and, in certain cases, the entire web. Since this process produces automatically webs of elliptical form, it is obvious that to have a finished web of that shape is the most economical, but webs of any other shape may be obtained by machining from the ellipse.

It is not possible to produce a crankshaft with balance weights integral with the webs. If desired, however, balance weights may be fitted by bolting or welding to the webs. Alternatively, in some instances balance weights may be eliminated and replaced by vibration dampers.

Data have shown how the toughness and resistance to fatigue may be raised by 30 to 40 pct when the grain flow of the steel is brought to the same direction as the main tensions on duty.

Finally, the quality of the steel, even from the center of the ingot, in a crank forged in this manner is reported superior to that in a conventionally forged crank, since a smaller ingot is used and the segregation in the center of ingots increases rapidly with ingot size.

TABLE I

Characteristics of Specific Types of Crankshafts Forged by the RR Method

	Diameter of Pins and Bearings, In.	Throw, In.	Length of Journals, In.	Length of Pins, In.	Thickness of Webs, In.	Number of Throws	Rough Weight, Lb	Min'um Press, Cap'city Req'd, Net Tons
1	4¼	6¾	1½	1¾	1¾	8	600	600
2	5	7¼	2	2	2	8	780	700
3	5¼	8¾	2¼	2¾	2½	8	1,300	900
4	4¾	10¾	2½	2½	2½	6	950	1,000
5	7¾	11½	3¼	3½	3¼	6	2,800	1,800
6	8	12	3¾	7½	4	4	3,300	1,900
7	7½	12¾	3¼	2½	3¾	8	3,900	1,800
8	7	13	3¾	3¼	3½	8	2,250	1,700
9	9¾	14¼	5½	3½	4¾	6	7,400	2,900
10	11¼	20	7	8	6	6	13,300	4,600
11	11¼	24	6¼	5½	8	6	14,200	5,200
12	13	28½	9¾	7¾	7¾	6	21,500	8,600

How Link-Belt Produces Ball and Roller

The production of ball and roller bearings demands close machining tolerances and critical gaging techniques. This article describes in detail the manufacturing methods used at the new Dodge plant of Link-Belt Co., Indianapolis, with particular emphasis on material used, heat treatment, tooling, coolants, grinding methods and gaging.

THE machining, heat treating, grinding, finishing, assembling and inspection of precision bearings are highly specialized procedures. Both bearings and housings, or mountings, are made at the Dodge plant of Link-Belt Co., Indianapolis. Sizes and types are almost infinite when all the possible combinations of split and solid, roller and ball bearings, in any one of a dozen different type mountings, are considered. There are about 2800 possible mounted bearing combinations, using all the various types and sizes made by this company. Fortunately, the manufacturing processes by which all bearings are made are not fundamentally different.

Standard SAE 52100 bearing grade steel and carburizing SAE 4620 alloy steels are used. In ball bearings, inner and outer rings and balls are made from 52100 steel. Most inner and outer rings are made from seamless tubing. The bearing retainers are formed from low carbon, deep-drawing quality strip.

Roller bearings for solid type mountings are made from SAE 4620 steel, while roller bearings of the DE type, used in split mountings, are made from SAE 52100 steel. Practically all rings under 8 in. diam are made from tubing. Rings over 8 in. diam, however, are machined from rolled ring forgings. Where inner rings require

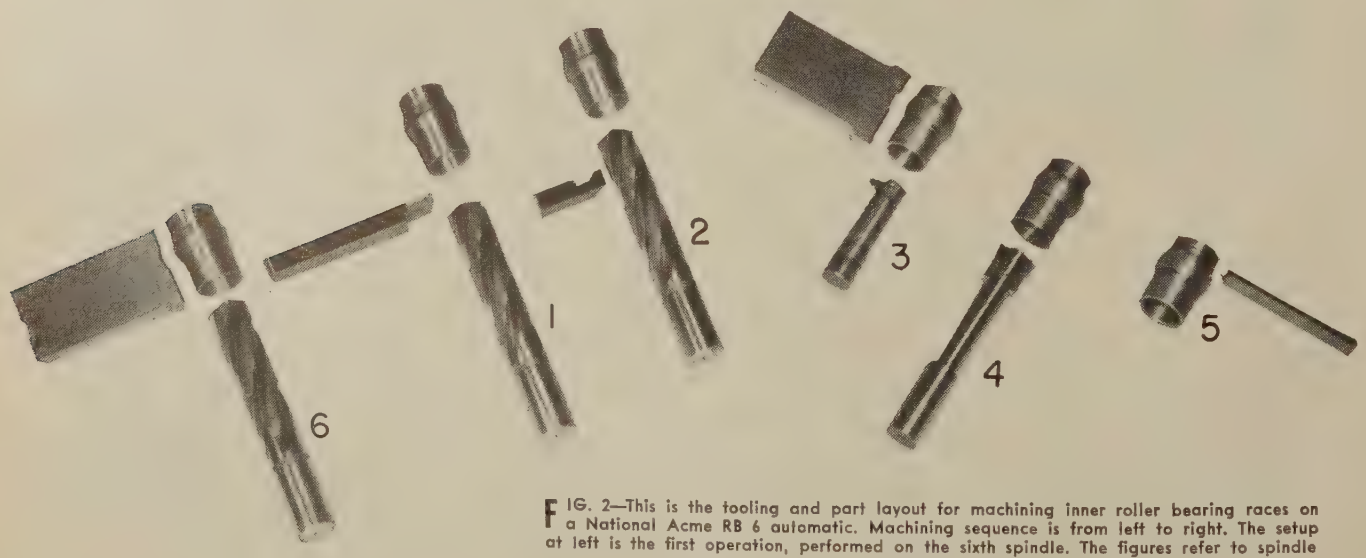


FIG. 2—This is the tooling and part layout for machining inner roller bearing races on a National Acme RB 6 automatic. Machining sequence is from left to right. The setup at left is the first operation, performed on the sixth spindle. The figures refer to spindle numbers.

Bearings . . .

BY D. I. BROWN
Chicago Regional Editor,
THE IRON AGE

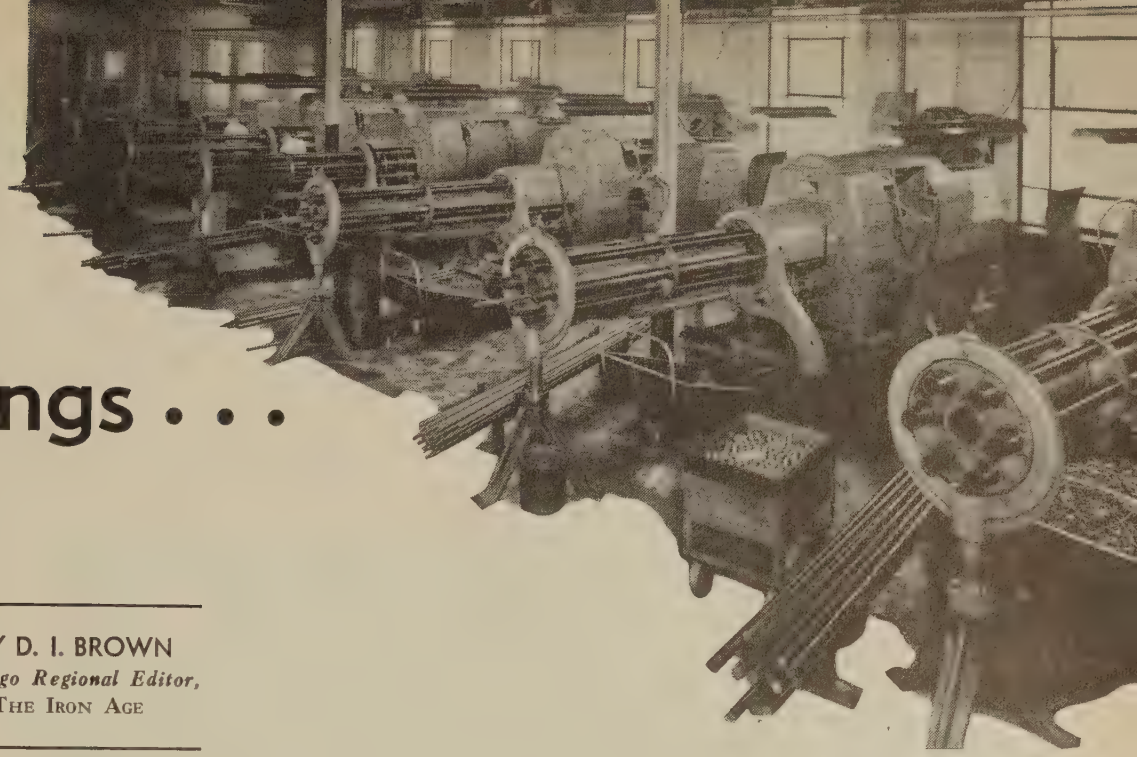


FIG. 1—This battery of six-spindle automatics performs the initial forming operations on bearing races. The two machines at right work bar stock, and the others work on tubing.

a thick section, they are machined from bar stock or rolled ring forgings, since heavy wall tubing in small diameters is not available.

Initial machining of most bearing components is done on automatic screw machines. Fig. 1 shows part of the screw machine department at Link-Belt. Tubes or bar stock are machined on four- or six-spindle automatics. In cases where larger parts are made, single-spindle Cleveland automatics are employed. Final dimensions are achieved by grinding so that accuracy in machining on the automatics is important.

The automatic screw machines used include single-spindle machines handling up to 6 in. bar stock and 8 in. tubing; and multiple-spindle machines handling up to 4¾ in. diam bars and tubes. Fig. 2 shows the tooling and machining station sequence on one of the 2⅝ in. National Acme RB 6 automatics. The part is a roller bearing inner ring machined from SAE 4620 cold drawn and stress-relieved steel, with a hardness of 150 to 175 Bhn. The tube size is 2.043 in. OD and 1.345 in. ID.

The second set of tools from the left in fig. 2 is the first spindle position. The machining sequence starts at the sixth spindle, so that the operation proceeds from left to right.

The spindle speed or work rotation speed is

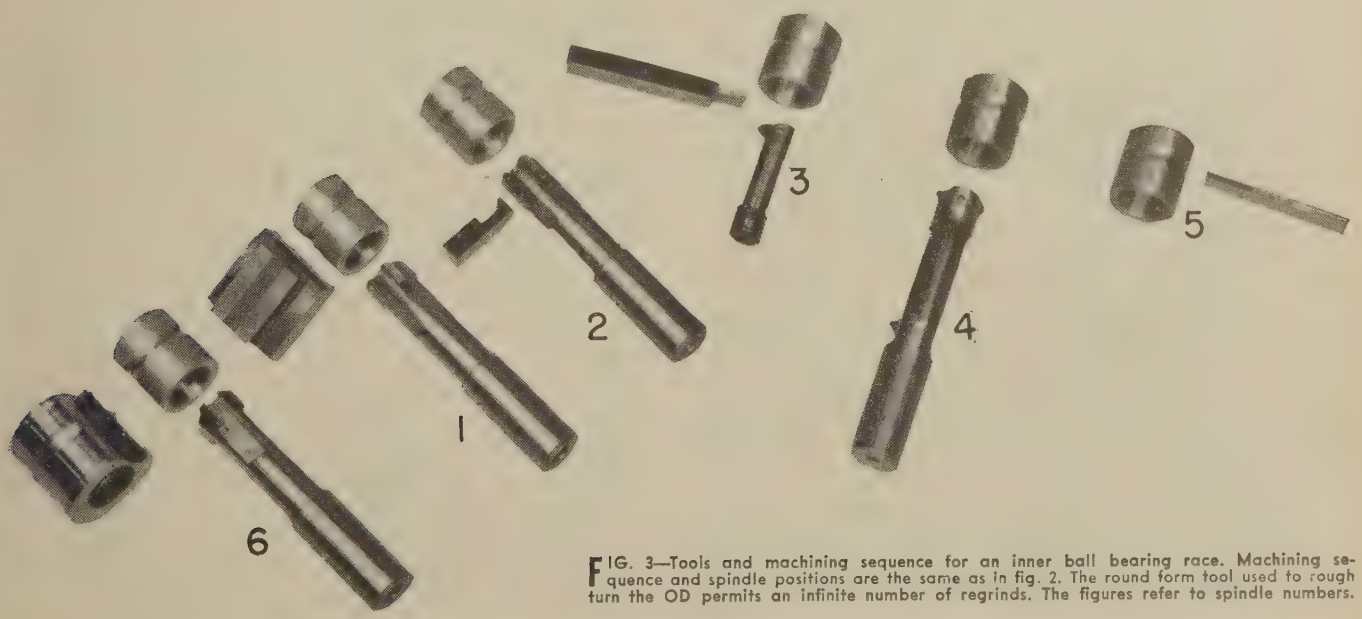


FIG. 3—Tools and machining sequence for an inner ball bearing race. Machining sequence and spindle positions are the same as in fig. 2. The round form tool used to rough turn the OD permits an infinite number of regrinds. The figures refer to spindle numbers.

266 rpm, and the cutting speed is 151 sfpm. At the sixth spindle position, the first setup on the left in fig. 2, the tube is drilled through one third and the OD is rough formed. In fig. 2, all the tools shown below the parts work off the main tool slide, and the tools at the sides of the parts work off the cross slides.

In this first machining operation the cross slide feed, controlling the form tool, has a feed of 0.0018 in. per revolution. The main tool slide feed is the same at each station, but the cross slide feed can be varied at each station.

At station No. 6 the form tool completes its travel just before the drill finishes its feed. This permits the form tool on the cross slide to start retracting before the drill on the main tool slide starts to retract. If this precaution were not taken the form tool would be unduly stressed and might chip or break. The drill supports the tube and helps keep the tube from deflecting sideways under the cross pressure of the form tool.

The second operation from the left in fig. 2 spindle No. 1, faces and core-drills the second one-third of the depth, the facing tool feeding in at 0.0024 in. per revolution. Again the drill helps support the work, but no provision is made for the cross slide to retract before the drill finishes its feed. At spindle No. 2, the part is core-drilled the last one-third and the front of the part is chamfered. Both tools at this station are mounted on the main tool slide, the chamfering tool fitting into the flute of the drill. The cross slide is not actuated at this spindle position. In the fourth operation, the part is finish formed on the OD and recess back chamfered.

Operation No. 5 is somewhat different. The tool works off a special reamer slide and feeds at 0.027 in. per revolution. The operation is called an accelerated ream. The next machining operation is the cutoff. In this, operation No. 6, the cutoff tool feed is 0.0024 in. per revolution, and the main tool slide is idle. This is spindle No. 5 position on the machine.

High speed 18-4-1 steel is used for the drills, reamers and cutoff tools on this setup. The form, facing and chamfering tools are tungsten-cobalt, and the cutting fluid is Marathon 875-12. The entire machining cycle on this bearing race takes less than 30 sec.

Tolerances on length of this part are $\pm$ 0.003 in.; on the diameter, $\pm$ 0.002 in.; and there is a 0.003 in. total tolerance held on the bore. Runout is held to a total indicator reading of 0.001 in. The largest finish diameter is 2.008 in. The finish bore is specified 1.477 in. and length of the part is specified 2.886 in.

Only about 0.035 in. is removed from the original tube diameter. Thus, the stock must be free from seams, cracks and other surface defects, since little cleanup is possible. Decarburization on the surface of the tube is negligible, because the parts are carburized later and, unless the decarburization is excessively deep and almost 100 pct complete, machinability is not affected.

One other automatic machining cycle typical of such setups is detailed in fig. 3. The part is a ball bearing inner race. The steel is SAE 52100, cold drawn and spherodized-annealed; and averages 200 to 240 Bhn. The sequence of operations in fig. 3 proceeds from left to right and the setup at left is used on the sixth spindle of the machine.

This part is machined on a 2⅝ in. six-spindle automatic screw machine. The spindle speed, or the tube rotation speed, is 124 rpm. The tools used are of the same type as used in the previous job, as is the cutting fluid. Tolerances on dimensions, length, bore and runout are also identical with those specified on the roller bearing ring.

The first operation on the inner race, shown in fig. 3, is rough forming the OD and core drilling one-third of the bore depth. The cross slide feed is 0.0011 in. per revolution. The second operation is finish forming the OD and core-drilling another third of the bore depth. The form tools feed from cross slides and drills feed from the main tool slide. The third operation core-drills through the bore and front chamfers with both tools working on the tool slide. The chamfer tool fits behind the cutting lip of the drill and engages the work just before the drill completes its cut. The fourth operation is facing and back chamfering, and the fifth operation is an accelerated ream. Again, the reamer slide is used, feeding 0.0201 in. per revolution. Both the cross and main slides are idle at this station. The cutoff is the final operation and cutoff tool feed is 0.0017 in. per revolution. Total time to complete the machining cycle on this part is less than 1 min.

Tube diameters are 2.50 in. OD, and 1.650 in. ID. The largest finish diameter is 2.450 in., length is 2.602 in., and bore is 1.744 in. The critical raceway is undercut considerably lower than is the largest OD so that the surface imperfections on the original tube are less important than in the roller bearing race. Excessive decarburization would be more important on this part than on the former part, which is carburized. Very little trouble is experienced, however, because the mills take all possible precaution to prevent decarburization.

Large rings are machined on National Acme Chuck-Matics, automatic chucking machines. Fig. 4 shows a battery of these machines. Usually the rings are rough bored and cutoff on the single-spindle Cleveland machine. From there they are taken to the first Chuck-Matic where they are faced and rough bored. This machine has an external chuck and the machining time is 65 sec. Cutting speed is 349 sfpm.

The work is then manually transferred to the second Chuck-Matic. This single-spindle chucking machine is equipped with an air chuck of the internal expanding type. All tool feed slides are driven by drum cams, and five separate tools are used to machine the 7¼ in. diam roller bearing outer ring, as shown in fig. 5. On this particular job the spindle speed is 191 rpm. All tools are Kennametal KM carbide tipped, the tips being brazed to the tool holder with silver solder. Cutting is done at 355 sfpm.

Five separate machining operations take place on this second Chuck-Matic. Right and left tool slides move in together, the tools on the left slide

finish turning and facing the OD, using a feed of 0.003 in. per revolution for facing and 0.016 in. feed per revolution in turning. The right tool slide chamfers the race. As soon as the turning tool finishes its cut, the front slide, already in position, moves against the ID of the ring. One tool on this slide cuts the groove at a feed of 0.0025 in. per revolution, while a feed of 0.004 in. per revolution is used on the second tool on this slide which is the radius cutter. The cutting fluid used on this job is 82EB Marathon oil. Machining time for these five operations is about 1 min.

The parts are transferred from this machine to the third Chuck-Matic. Here the ring is turned around so that the back of the part faces forward. On this machine the raceway is finish machined and the outer radius is formed. Machining speed is 349 sfpm and total machining time is 49 sec. All parts are heat treated after being machined. During the machining operation the parts are constantly inspected and gaged to keep scrap at a minimum and to obviate trouble in heat treating and grinding. The two grades of steel used in bearings require distinctly different heat treatments. The parts made from SAE 4620 are always carburized to give a hard case. The carbon is built up to around 1.00 pct and carburizing is done in conventional gas carburizing furnaces. Case depth varies from 0.035 to 0.125 in., depending on the size of the part and the type of bearing. Carburizing takes place at 1600°F and the parts are oil quenched from the carburizing heat.

The parts are then reheated to 1500° to 1525°F, and quenched again in oil to a hardness of Rc 64 to 66. They are then tempered at 350°F and the final hardness of the case is Rc 61 to 63. The uncarburized core hardness is appreciably lower, usually around Rc 35, and will vary with the section of the part.

Outer rings over 4 in. diam are jig quenched to prevent distortion. It is not necessary to jig quench inner races as the section thicknesses are heavy enough to resist distortion.

Parts made from SAE 52100 are heated to 1500°F and oil quenched to Rc 64. The hardness is drawn back to Rc 61 to 63. An oil-spray quench is used on the large rings where section size requires a better H value than available in the regular oil tank. None of the ball bearing rings made from SAE 52100 are jig quenched. All balls are delivered in the heat treated condition, with a hardness of Rc 65.

Everything in a bearing is hard and tough; hard to withstand wear and tough to withstand shock. A hardness of Rc 61 to 64 is not too difficult to achieve but to obtain such hardness without cracking or soft spots with a minimum of distortion, residual stress, retained austenite or other objectional characteristics, requires careful control and practice throughout the heat treating procedure.

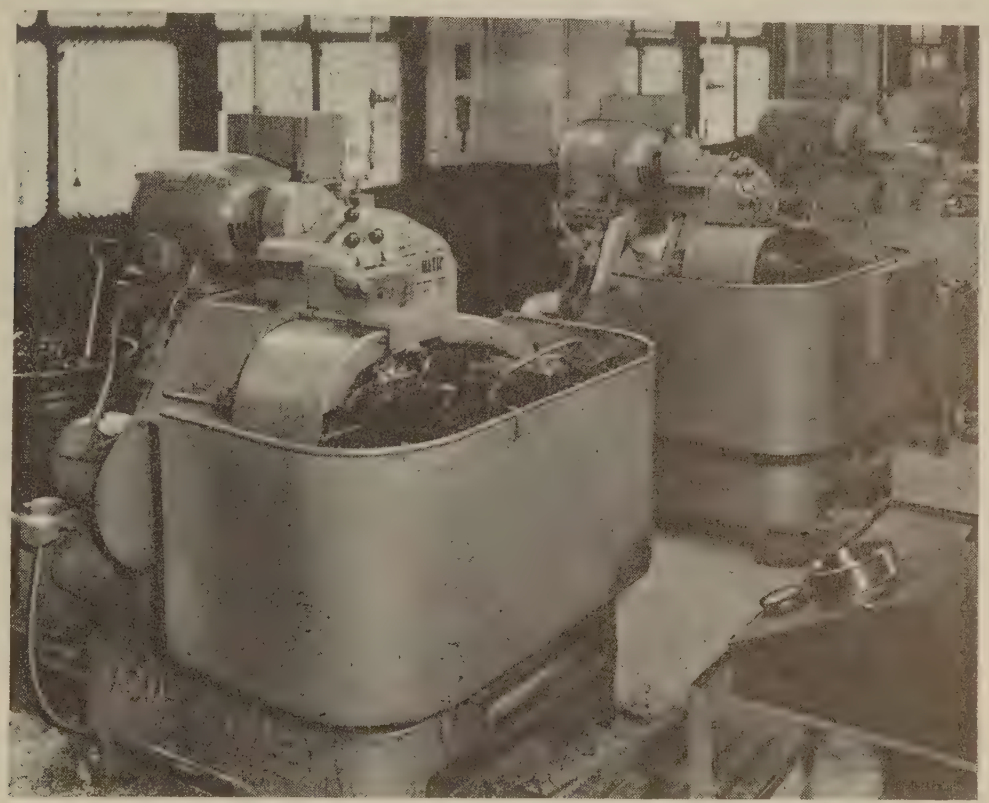
Most retainers for roller and ball bearings are formed from SAE 1010 cold rolled strip and are not heat treated. The retainers in DE roller bearings are cyanide hardened. Retainers are swaged to close tolerances and a good contact surface between the rollers and the retainer is obtained. Clearances run 0.005 to 0.006 in.

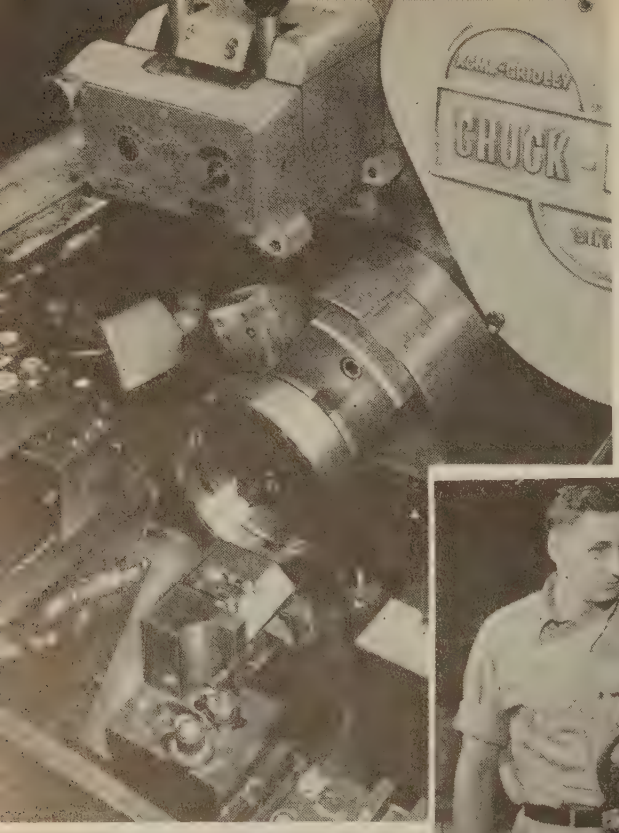
After heat treating, parts are grit blasted and then finish ground. All races and rollers are comparison ground to final dimensions. Master parts

o o o

FIG. 4—The battery of single spindle Chuck-Matics rough inner raceways of outer bearing rings. Indicator gages shown at lower right check the inner raceways of the outer ring.

o o o



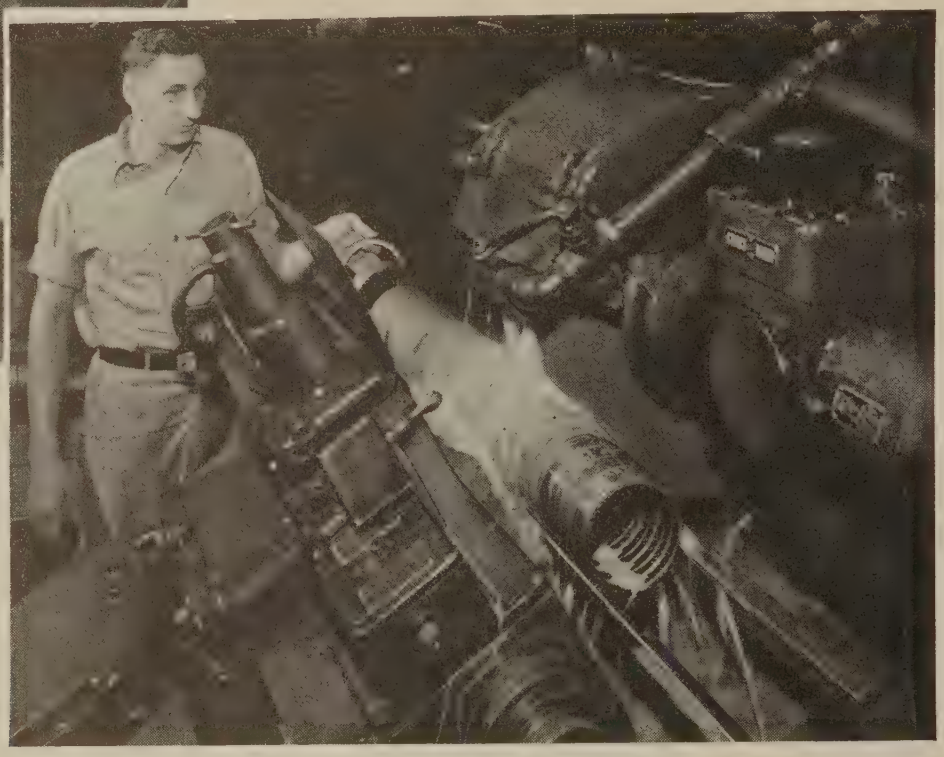


LEFT

FIG. 5—This closeup shows the tooling used in machining large roller bearing outer races on a chucking machine. Only three tool slides of the four available are ordinarily used.

BELOW

FIG. 6—Outside diameter of outer rings are ground on a centerless grinder. These parts are passed through the grinder four to six times before reaching final size.



are kept at each machine and the production parts are regularly checked.

In fig. 6 the OD of the outer double row roller bearing rings, about 7⅞ in. diam, are being ground on a No. 4 Cincinnati centerless grinder. The work revolves at about 80 rpm on this particular job. The rings are 2⅛ in. wide, and are run through the grinder four to six times. Too deep a grind will cause grinding checks so that 0.006 in. on the diam is removed on each pass.

Traverse speed of the part through the grinder is 3 to 3½ fpm. The grinding wheel is 24 in. diam x 8 in. wide, and is a 60 grit, vitrified bonded wheel. Grinding speed is 5500 sfpm. The lower wheel is set at a slight angle, 1½° to 2°; this tangentiality causing the part to feed across the face of the grinding wheel. About 100 parts an hr are ground on this machine. The finish after this operation is 15 to 20 microinches and parts are held to a tolerance of 0.0007 to 0.0008 in. The grinder is equipped with a hydraulically operated, diamond wheel-dresser. The coolant used is Kelkut.

The raceways of 2¾ in. diam ball bearing outer races are ground on Van Norman radius grinders, as shown in fig. 7. The raceway must be concentric to the spherical OD, and central between the two faces. In addition, this raceway must be parallel to the faces. Then the raceway itself has to be an accurate segment of a smaller sphere and held to a definite relationship to the ball itself.

In fig. 7 the raceway can be seen on the second machine in the external expanding chuck. Each of the eight fingers of the chuck are backed up by spring pressure. The fingers are ground to the same radius as the OD of the bearing ring, and the chucks hold the work to within 0.0002 in. of true center. The grinding wheel advances into the ring and then changes direction 90°, moving against the work.

The whole head containing the chuck oscillates at 90° to the axis of the grinding wheel. The oscillating motion of the head automatically dresses the wheel, holding the wheel contour to its original form. Spindle speed is 600 to 800 rpm, and 0.010 in. is removed on the diameter. The wheel used to grind the raceways in this

particular part is 2 in. diam, 120 to 150 grit, and rubber bonded. The grinding speed is 6000 sfpm and the coolant used is Kelkut. Production on this part is about 1 per min. After grinding, raceways are polished by lapping to a 2 to 3 microinch finish.

During grinding a Van Norman electric gage arm, with a diamond contact tip, rides on the raceway. This gage is swung in and snapped into position just as grinding starts. The gage is set so that it trips a switch after the proper amount of metal has been removed. When the switch is actuated, the cycle is complete, the grinder head moves back to center and pulls out, the oscillating head stops, the electric gage swings out of position, and the ring is removed from the chuck.

Two feeds are used on the grinding head. During the removal of the first 0.008 in. on the diameter, a coarse feed is employed. Upon completion of this stock removal, a rheostat, operated by a dc motor, automatically switches to a finer feed until the electric contact gage actuates the shut-off switch. The radius of the raceway is checked on a Jones & Lamson comparator by casting a soft metal into the raceway for the form, and projecting its contour, enlarged 30 diam, on the screen. Sheffield shadow gages check the diameter of the raceway of the outer race.

A Microcentric grinder, made by Cincinnati Milling Machine Co., grinds the OD on a 3½ in. diam outer ball bearing ring. The races are fed into the loading trough by hand and drop into the grinding position. The cam then pushes the race into a friction chuck attached to the driving spindle. The parts ride on carbide shoes, which are silver brazed to the two shoe holders. The part revolves against and opposite to the direction of the grinding wheel.

This grinding wheel is a 20 in. diam, 60 grit, vitrified wheel, and is diamond dressed manually by a lever operated wheel dresser. The grinding speed is 5500 sfpm, and the coolant is a soluble oil.

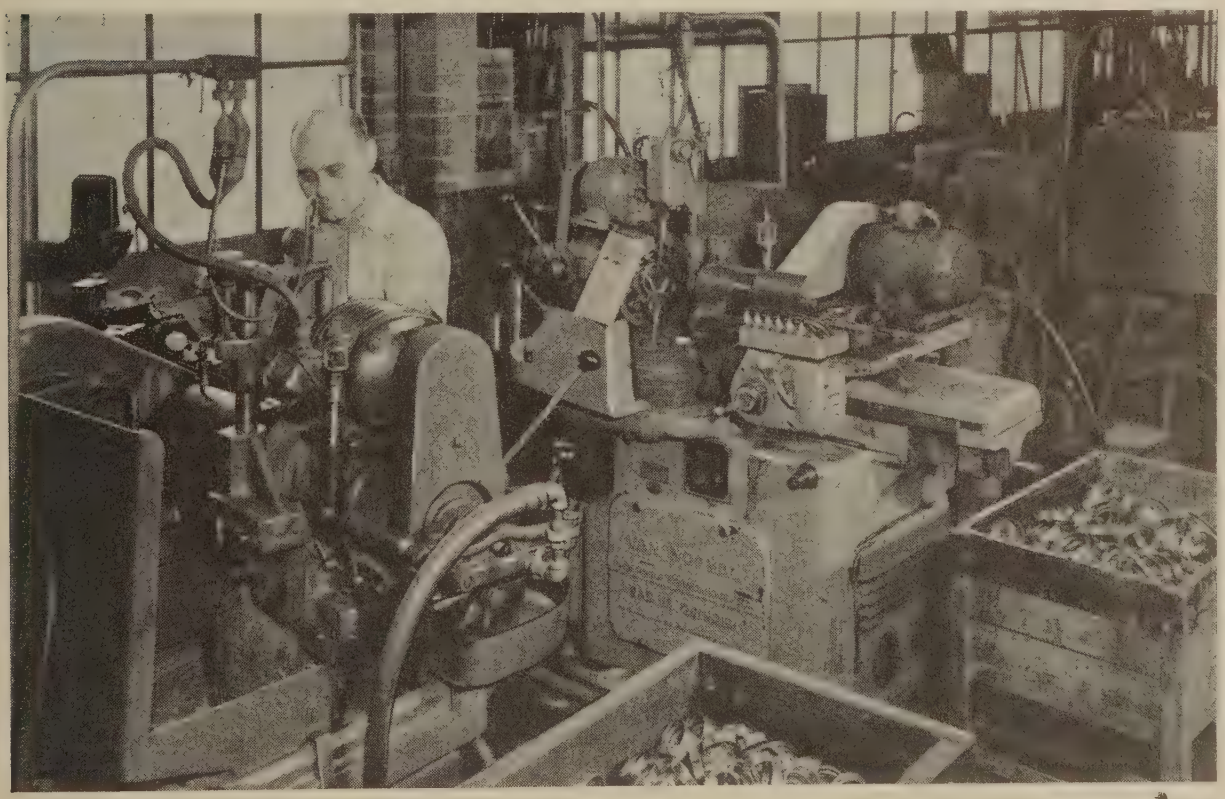
The grinding wheel is hydraulically driven. On this part, total in-feed of the wheel against the work is 0.012 in. to 0.014 in. Rough grinding takes 28 sec per piece. Finish grinding, done on the same machine, takes 18 sec. The finish on the OD of the ring is about 15 microinches. Tolerances on the OD are held at 0.006 in. The arrangement of grinding wheel and work support on the machine makes it impossible to grind work out of round.

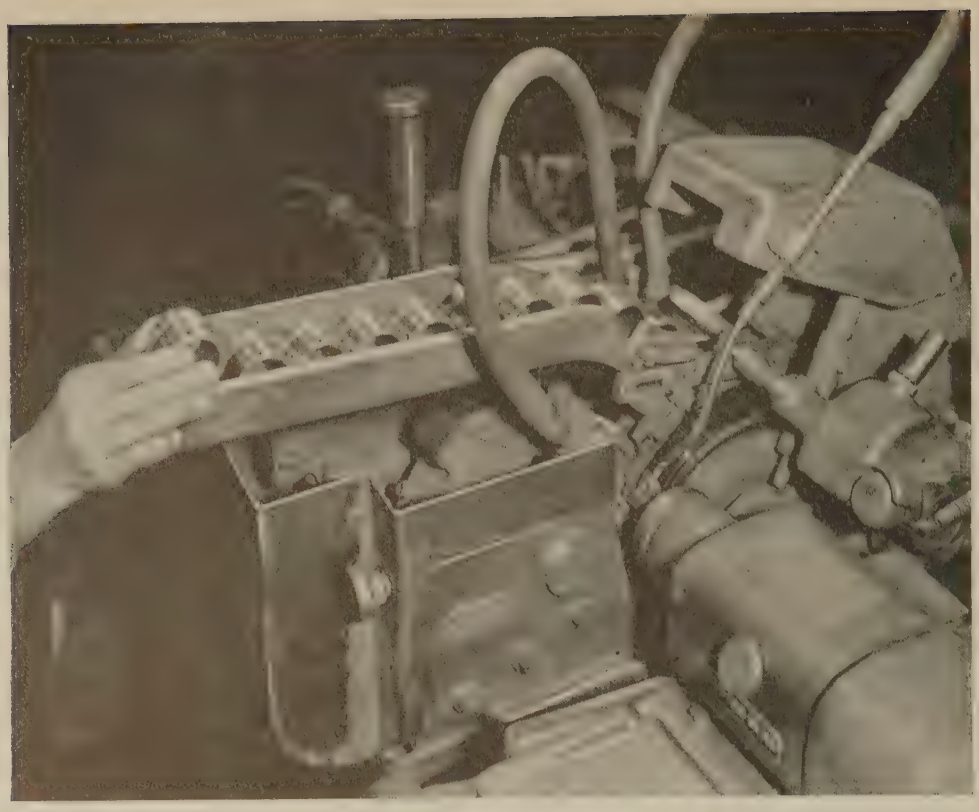
The Heald centerless internal grinder, shown in fig. 8, is equipped with a chute feed and grinds the bore of ball bearing inner rings. This bore fits onto the shaft and is held to a tolerance of 0.0005 in. The grinding operation takes about 1 min and a total of 0.006 in. is removed per side.

The wheel is 1⅜ in. diam, 1 in. wide; and is a 60 grit, vitrified bonded wheel. The coolant used is Kelkut and grinding speed is 5000 sfpm. During grinding, one drive wheel engages the OD of the ring and fixes the proper alignment. The grinding wheel and a pressure roll also engage the work. The whole operation, as in all grinding so far discussed, is automatic.

Gaging is automatic as on the Van Norman machine. Two disk gages attached to rods contact the work during grinding. These gages have two diameters, one to fit the rough machined ID and the other to fit the finish ground ID. As the

FIG. 7—On these Van Norman radius grinders, raceways are finish ground. On the machine at right, a race can be seen chucked in position in the oscillating head. An electric contact gage is swung into position on the second machine and is plugged into the overhead conduit line.





o o o

FIG. 8—Centerless grinding the internal diameter of ball bearing races is done on a Heald machine. The machine, equipped with automatic disk gages, stops grinding after the proper amount of metal has been removed.

o o o

inside surface removal takes place, the finish ID gage moves in until it fits. This action, when complete, trips a switch that causes the machine to end its cycle. The grinding wheel retracts and the cam actuated lever comes up from the bottom, lifting the part out of the machine and simultaneously placing the next part in grinding position.

Some parts after wet grinding go direct to the inspection department. Others that require better surfaces are lapped or polished prior to inspection. Lapping or polishing is done on all roller and ball bearing raceways.

There are certain types of bearings in which lapping to extremely fine surfaces is not essential. Bearings will lap themselves after 10 to 15 min of operation and will produce a good surface whether or not they were previously lapped. However, to maintain and produce as perfect a frictionless bearing as possible, bearing makers polish raceways. In so doing, they minimize the possibility of heat generation during the first few minutes of operation of a new bearing.

During wet grinding frequent inspection takes place to assure proper tolerances. Final inspection includes tolerance measurements and visual inspection for defects such as cracks, insufficient clean-up in grinding, etc. Gages used at Link-Belt include air, comparator and electric types.

The particular part governs its inspection and in some cases a special check is necessary. One such case is the raceway of the outer ball bearing ring. This radius, aside from electric shadow and comparator gage inspection, is subjected to optical comparator gaging in which the contour is magnified 30 times.

Rings, taken at frequent intervals from the Van Norman radius grinder, have soft metal cast into the raceway. An enlargement of the contour of this casting is then projected on a Jones & Lamson comparator screen so the radius of the raceway can be accurately checked. This inspection helps to hold the closest possible tolerance in grinding.

Eccentricity tolerances are close. Wet Magnafluxing spot checks are made on all ground parts. By this method subsurface defects that are impossible to find visually can be detected. Although the parts are not 100 pct Magnafluxed, the sampling procedure is such that bad heats of steel can be caught before assembly. In cases where steel defects are found in parts, the entire lot made from this heat is held for 100 pct inspection.

The manufacture of various types of solid and split bearing mounts and pillow blocks and additional information on gaging methods will be described by the author in the concluding part of this two part article.—Ed.

• • •

Broaching Automotive Door Hinges

FIG. 1—Broaching has resulted in reduced costs in the manufacture of these door hinges by one automotive plant. A single fixture with adapter to hold various hinge sizes during cutting permits broaching the flats and the oil groove on the hinges shown in the lower photograph. Parts are loaded two at a time, and stationary hydraulic clamps grip the parts after the fixture shuttles into cutting position. The clamps release automatically at the end of the cutting stroke. The broaching machine is a 10 ton, 36 in. stroke Colonial, Model VBS.

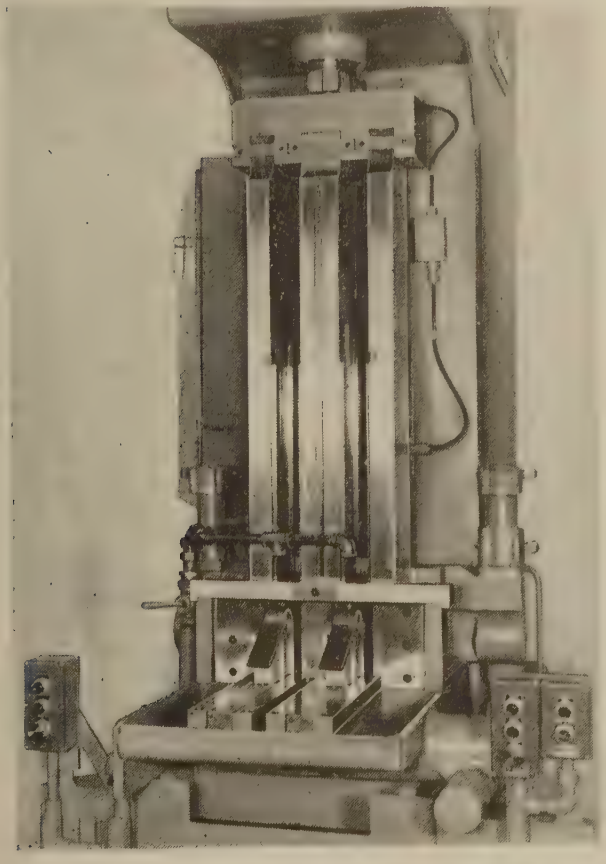
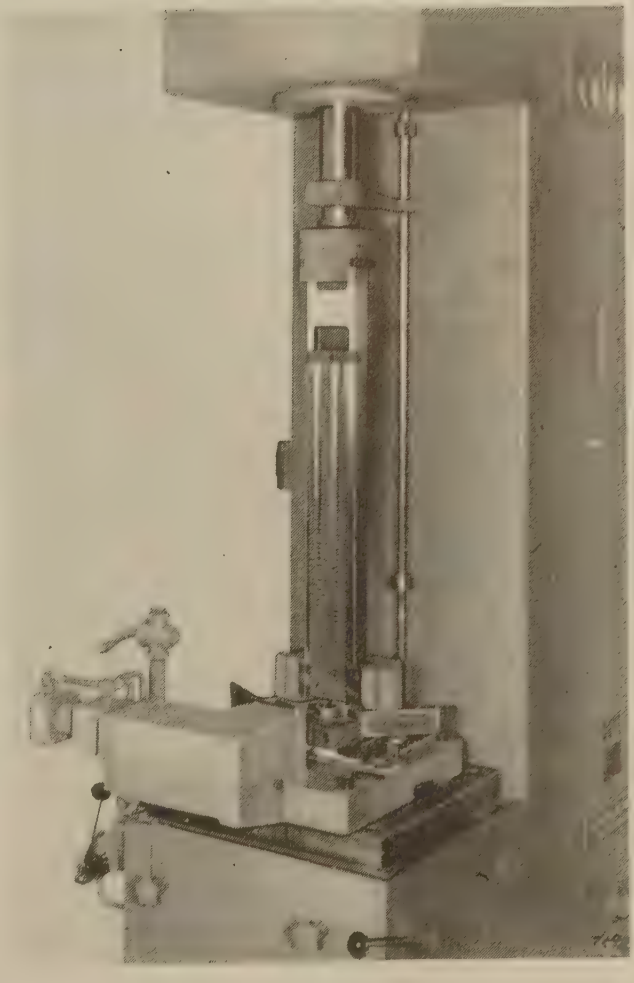


FIG. 2—The half-round end of various shapes and sizes of auto door hinges such as shown in the upper photograph are broached two at a time in this machine setup. A single double-station, non-shuttling fixture is used with individual adapters for different type hinges. The parts clamp hydraulically. Broaching of the side flats is done on another machine. The broaching machine used is a 6 ton, 36 in. stroke, Colonial Senior press.



Production Use of Boron Steel

THERE are no apparent phenomenal advantages of boron steels, but rather it has been established that these steels possess certain characteristics that place them within the list of lean alloys, insofar as properties are concerned. Boron steels afford reliable hardenability and heat treating characteristics, and in proper application have processing advantages over steels of higher hardenability. The field of advantageous application bridges the gap between straight carbon steels and lean alloys, enabling the metallurgist to specify a material that will fulfill the requirements of the application more closely than either a lean alloy or a straight carbon steel.

In a paper entitled "Production Use of Boron Steel," delivered at the recent Western Metals Congress by F. J. Robbins, vice-president, and J. J. Lawless, assistant metallurgist, Plomb Tool Co., Los Angeles, the authors discussed the development of one particular boron steel analysis and evaluated it on the basis of various production operations such as forging, hot forming, machining on automatic screw machines, and standard heat treatment, that are encountered in volume production operations. Data are also presented, based upon standard hardenability, tensile and impact tests.

In working with a hardenability specification wherein the analysis is intended to be only the minimum necessary to provide such hardenability, careful control of the results is extremely necessary because heat treatment of material low in hardenability is always expensive and difficult. As steel suppliers have gained experience in the use of boron, substandard heats have become less frequent.

In considering the performance of boron steel from the standpoint of forgeability, large tonnages of this material have been forged in closed impression dies on board-drop hammers where die life is an extremely critical consideration and seriously influences the cost of the operation. In the forging of one specific part where NE 9445 steel was used, an average die life of 13,000 to 15,000 pieces per die sinking was obtained. With boron steel, and with precisely the same requirements in the finished part from the standpoint of mechanical properties, dimensions and other characteristics, an increase to between 22,000 and 25,000 forgings per die sinking resulted. Naturally, a considerable reduction in the cost of this operation was made possible.

Decarburization and scaling characteristics are also important factors to be considered concerning the suitability of boron steels. Decarburization is not as dependent upon analysis as is scaling, and studies have failed to indicate any greater tendencies toward decarburization of boron steel, either with respect to straight carbon steels of comparable carbon content or with respect to alloy steels with which the boron material has been compared. Scale, as found on boron steels, was discovered to be much lighter, and less adherent in the finished forging than the higher alloy types. Scale formed on the boron steel more nearly corresponds to that of straight carbon steel, being looser and flakier, and permits easier removal in the forging die itself with little tendency to be driven into the surface of the forging.

Where machining operations such as broaching, milling, or drilling are performed on forged parts as secondary operations for finishing, microstructural conditions which control speed of cut, feeds, and part finish, are of extreme importance, and represent a tremendous factor in final cost. One factor which makes for trouble in machining and which has been considerably overlooked is that of uniformity. Continuously annealing operations properly devised, adequately controlled and well supervised, keep costs low and assure maximum uniform production rates with a minimum of machine downtime and interruption of production.

The use of continuous furnaces for such operations has proved to be far more productive of suitable results. Experience has shown that boron steels are peculiarly adapted to a normalizing treatment at 1650°F, followed by a tempering operation at a temperature to provide a part hardness determined by experimentation to be best suited for a given operation. Production operations of this type can be successfully performed with a minimum of labor and the lowest possible cost, at the same time producing uniformity of microstructure and hardness with subsequent machining reliability. Furthermore, the operating cycle is only about one-third that required by the higher alloy types.

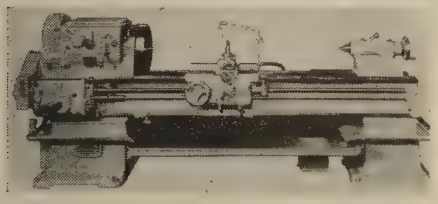
From the standpoint of economy, the adaptability of the boron analysis to low temperature annealing is probably the most outstanding advantage of the material. For example, in one plant, two continuous furnaces arranged for normalizing, partial cooling and high draw, replaced six box furnaces. The continuous equipment operates for 8 hr, consumes approximately 20,000 cu ft of gas and requires only one operator. The superseded equipment, in order to handle equivalent production, was operated for 16 hr, consumed about 15,000 cu ft of gas and required a total of six operators.

Observation of promising reports on sodium-bisulfite-treated steel prompted some experimental runs of similarly treated boron steel. In controlled tests conducted with sulfite-treated boron steel, the treated material showed a 22 pct greater production in pieces per hour as compared with regular boron steel.

New Production Ideas . . .

Lathes, shapers, a core drier, inert gas and multiple electrode resistance welders, heat treating furnaces, a small sandblaster, an etcher-demagnetizer, and industrial truck dumping and fork attachments are presented in this issue. Small tools and equipment include boring bars, saw blades, broach adapters, a releasing tap holder, welding torches and a hole gaging spindle.

SIXTEEN spindle speeds, increased horsepower capacities, and several optional speed ranges to give complete coverage for work requiring slow speeds for heavy



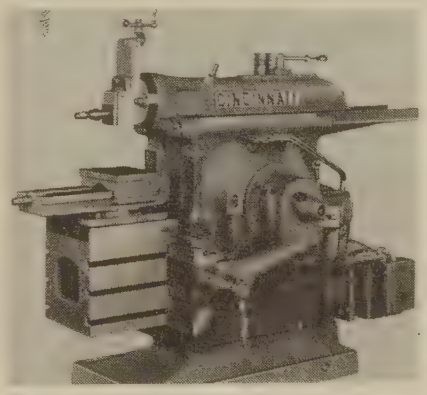
cuts as well as high speeds for carbide tooling, are features of new engine and tool room lathes. To facilitate operation, a three-lever gear shifting system is designed without any pass through gears. Shifting levers are arranged to require a minimum amount of shifting for a normal sequence of lathe operations. A new design of feed box uses lubricated sealed ball bearings. Sixty threads and feeds are available. Beds are supplied with either hand scraped ways or with replaceable hardened tool steel face way inserts. *Springfield Machine Tool Co. For more information, check No.* 1 *on the attached postcard.*

Boring Bar

CLAMPS and set screws are not required for use with a newly introduced boring bar designed with a bit that seats rigidly in the bar by means of a tapered fit. Tools consist of two parts, a bar and a bit. Complete bearing surface between the taper bit and the bar provides rigidity which is claimed to approach that of a solid tool. The taper bit is designed so that it will not push back or turn after it is once seated in the bar, assuring accurate boring of straight round holes. The taper bit extends ahead of the end of the bar. Grooving or boring may be done to a shoulder or face. Bars may be used either right or left hand. *Rockford Precision Tool Co. For more information, check No.* 2 *on the attached postcard.*

Utility Shapers

THE Cincinnati utility shaper is again in production, embodying many refinements found in the larger models. The table is supported directly on the cross rail without an apron and is heavy enough to take the full load without table support. This construction adds rigidity to the table by reducing the over-



hang. Higher speeds make the use of carbide tools on the shaper a practical application. Cutting speeds over 250 fpm are possible on a 10-in. stroke. Other features include automatic lubrication to all bearings, single point taper gib adjustment, and improved rail lock that operates from the operator's position. Utility models are made in 16 and 20-in. stroke sizes and can be equipped with a 3 or 5 hp motor drive. *Cincinnati Shaper Co. For more information, check No.* 3 *on the attached postcard.*

Saw Blades

CARBIDE tipped and cast-alloy-tipped saw blades available in segmental or solid types, have either triple-chip or special tooth grind. Segmental tipped blades are made in diameters up to 18-in. Tipped blades are manufactured to customer specifications or for specific production requirements. These blades are recommended for sawing plastics and non-ferrous materials and for milling ferrous and nonferrous materials. *Motch & Merryweather Machinery Co. For more information, check No.* 4 *on the attached postcard.*

Core Drier

CO-ORDINATING core room and molding floor operations in foundries is made possible with a new dielectric sand core drier. The unit known as the Foundromatic core drier consists of a radio frequency heater, an oven with electrodes, tuning assembly, ventilating system and end conveyers for loading and unloading. It is particularly adaptable where resin binders are used and results in improved core quality, increased production, reduced costs, greater flexibility and better working conditions. The core-making techniques need not

be modified when changing from conventional oven methods to dielectric core drying. A wide range of core sizes can be successfully handled by this method since the heat is developed uniformly in the core and drying is not dependent on thermal conduction from an external heat source. Time involved varies from 2 to 20 min depending on size of the core handled. The drier permits placing cores on its in-feed

belt as soon as they are made and the dried cores taken from the belt to the sorting table or directly to the molding floor without cooling. Heat radiation into the room is negligible and all gasses are exhausted outside the building. To operate, the new unit is connected to the power source. Full output is available without long warm-up periods. Thirty seconds is all that is required to permit heating of the tube filaments. *Allis Chalmers Mfg. Co. For more information, check No. 5 on the attached postcard.*

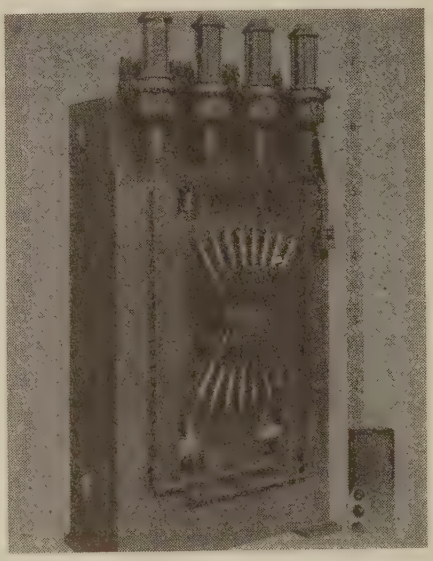
Inert Gas Welder

MODEL TIH-200-S AC welder for inert gas welding is equipped with supplementary low heat control. It may be used either

as an ordinary transformer type welder, or with the special features switched on for inert-gas shielded welding. Low heat control is accomplished by means of a secondary reactor built in and controlled by the hand wheel located on the side of the case. It can be switched on or off at the operator's will. When on, it is said to make possible effective welding current as low as 7 amp. *Hobart Bros. Co. For more information, check No. 6 on the attached postcard.*

Multiple Electrode Welder

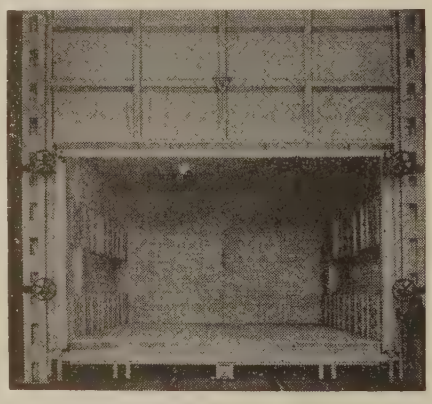
THE Air-Speed multiple electrode resistance welder is designed to take advantage of the compact hydraulic gun, at the same time eliminating the need for a hydraulic pumping unit. Air-oil boosters operate through air valves working in sequence, connected to the main air supply to provide welding force. Each welding gun passes welding current when a contactor, actuated by the sequencing mechanism, energizes the primary of the welding transformer. The Air-



Speed illustrated welds baffles in automobile mufflers made of 0.040-in. zinc coated steel at the rate of 480 mufflers per hr. It makes 16 welds per muffler in four progressive groups of four welds per group for a total of 7680 welds per hr. This sequence welding eliminates the need for an internal expanding work arbor. Each of two 50 kva transformers make two series welds per group. *Taylor-Winfield Corp. For more information, check No. 7 on the attached postcard.*

Recirculating Type Furnace

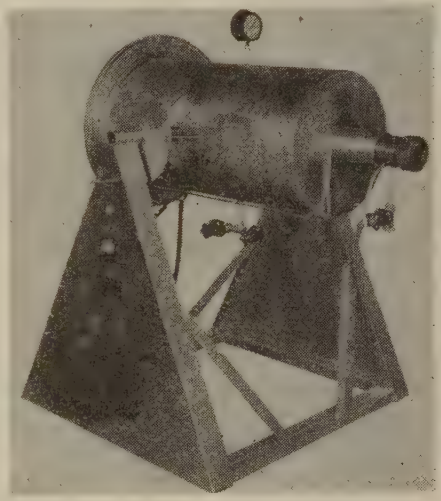
AN oil fired recirculating type car bottom furnace designed for close temperature control, provides uniform heat throughout the



work chamber for solution heat treating and stress relieving of aluminum gun foundations and stress relieving of steel weldments and high pressure piping. Temperature maximum is 1350°F. Working dimensions are 18x25x12 ft. The car forms the furnace floor and has special heat sealing edges. The electric car pull has 20 fpm max speed. The lift door is electrically operated. Two 3 million Btu per hr oil heaters furnish the heat. High volume fans transfer heat at great velocity through the work chamber to achieve required uniformity. Capacity for the weldments and piping is 12,000 lb; for aluminum gun foundations, 5400 lb plus 2000 lb of steel jigs and fixtures. The furnace has automatic temperature controls and suitable safety equipment. *Despatch Oven Co. For more information, check No. 8 on the attached postcard.*

Molybdenum-Vacuum Furnace

HIGH-TEMPERATURE operation up to 3500°F under a neutral or reducing atmosphere



pure enough to sinter chromium without oxidation is a feature of a new molybdenum-vacuum electric furnace. Recommended average operating temperature is approx 3300°F with the maximum peak of 3500°F for short cycles. The steel case of this unit maintains a vacuum of 30-in. Hg. The inner, or primary tube containing the molybdenum element may be removed without disturbing the furnace proper. Working area of the furnace is 2-in. IDx28 in. long, with an 18-in. controlled temperature length. It has one open end with a 10-in. vestibule or sight tube, and can be supplied with both ends open. The sight tube and face of the furnace are water cooled. The sight lens may be removed permitting the mounting of thermocouples. Power input required is 6 kw, 220 v, 60-cycle, single phase. *Pereny Equipment Co. For more information, check No. 9 on the attached postcard.*

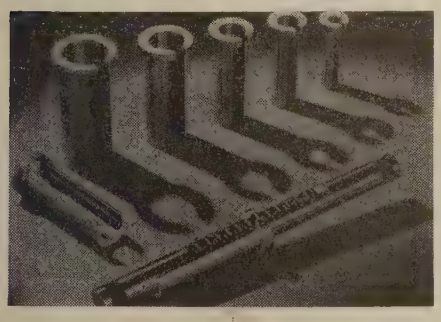
Abrasive Wheel

ORDINARY strips of abrasives are wrapped around the drum of a new type wheel developed for buffing, polishing and grinding op-

erations. Known as the Cone-Loc Drum Sander, the device is a balanced aluminum split drum, cushioned with rubber, the halves of the drum being locked into a solid drum by a cone type washer. Standard width abrasives, available in roll form, are wrapped around the drum and secured into place by pins that recede out of the way when the cone washer is tightened down. It is claimed the wheel never loses diameter and never needs dressing during buffing, polishing or grinding operations. Abrasive cloth in various grits can be interchanged on the same drum to accommodate rough or fine work. The drum which is adaptable for use with a flexible shaft as well as on a stationary arbor, is available in sizes from 6¼ to 12-in. diam and various standard widths and bores. *American Diamond Saw Co. For more information, check No.* 10 *on the attached postcard.*

Broach Adapters

ECCENTRIC bushing type adapters developed for use with the standard ⅜, ⅝, ¾, 1 and 1¼-in.



Glenny broaches are now available. With these adapters it is claimed that one size broach can be used to cut accurate keyways in six different diameter bores. To cut a keyway in a bore which is larger than broach diameter, a bushing-type adapter is inserted into the workpiece and a standard diameter broach is passed through it to make the cut. The shoulder on the adapter is designed to prevent it from falling through during the cutting operation. Blade bending or breakage is said to be eliminated by passing the entire broach through the workpiece. The new adapters feature 0.005-in. accuracy and are fabricated from hard chromium plated steel. They are available from stock in sizes from ½ to 2-in. OD. *Kase Machine Co. For more information, check No.* 11 *on the attached postcard.*

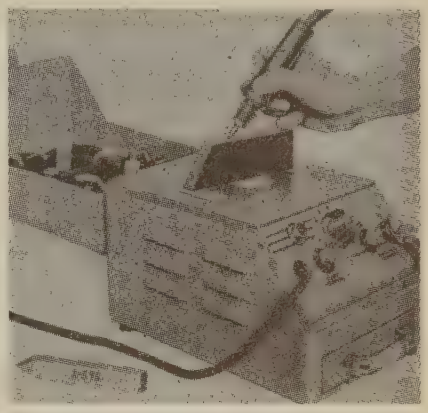
Gaging Spindle

CHECKING shallow large diameter holes is simplified with the use of a spider type gaging spindle that is used with the Pre-

cisionaire, a flow type air gage. The spindle enters shallow holes with ease regardless of the manner in which it is presented to the part. It is lighter in weight than the conventional spindle and can be handled continuously with undue fatigue. A reading with accuracy entirely unaffected by relatively rough surface finish is possible. The spindle is balanced for complete rotational accuracy and diameter locating surfaces are faced with tungsten carbide for long wear. *Sheffield Corp. For more information, check No.* 12 *on the attached postcard.*

Etcher-Demagnetizer

A COMBINATION etcher-demagnetizer permits marking and demagnetizing of tools in one operation. There are 14 etching heats ranging from 90 to 1350 w and anything made of iron, steel or its alloys can be marked. Magnetism can be removed from any drill, cutter, punch, etc., by placing the piece on the work plate. The demagnetizing capacity is 5 amp. The unit has a work plate 8¾ x 7¾ in. and ground clamp and lead are furnish-



ed for etching pieces too large to be placed on the machine itself. The tool operates on either 115 or 230 v, 50-60 cycle ac. *Crown Industrial Products Co. For more information, check No.* 13 *on the attached postcard.*

Welding Torches

INTRODUCTION of a series of torches that use atmospheric air and either propane or acetylene has been announced. This line has been designed primarily for use in small shops and torches are suited for radiator and battery repair work, sheet metal work, for silver brazing, refrigerator or condenser repair or similar work where compressed air and gas is not available. *Weldit Inc. For more information, check No.* 14 *on the attached postcard.*

Releasing Tap Holder

A NEW releasing type tap holder has a hole all the way through so that only the absolute working part of the tap need be exposed. The shank that fits into the turret

is separate from the body of the holder and the two parts are held together by screws. Screw holes in the shank allow 3/32 in. movement in any direction to align the tap with the hole in the work. The actuating dog is set so fine that work

with this holder can be done within 0.005-in. or as low as two threads before it automatically releases. By changing direction of the pawl, the tap holder may be changed for right or left hand tap. The holder may be made non-releasing by replacing the releasing pawl with a flat non-releasing pawl. *Marcellus Mfg. Co. For more information, check No.* 15 *on the attached postcard.*

Small Sandblaster

A SMALL, lightweight blast cleaning machine developed primarily for use where the installation of large heavy equipment is prohibitive, weighs 10 lb and stands less than 3 ft high. The only limitation to blasting requirements is

said to be the size of the compressor used. Construction is such that all parts may be quickly replaced. The tank, which is capable of holding 100 lb of sand, is constructed of ¼-in. steel and meets Code specifications. Any type of abrasive may be used including sand, grit, shot, seeds, and shells. The machine is said to work efficiently at as low a pressure as 20 lb and up to 100-150 lb pressure for removing corrosion on metals. *Sandaire Mfg Co. For more information, check No.* 16 *on the attached postcard.*

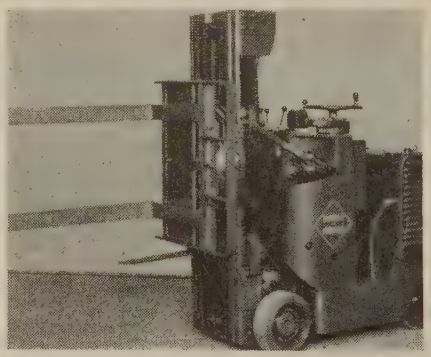
Dumping Attachment

THE latest adaptation to the line of Worksaver battery powered hand trucks is the non-tilting fork model equipped with a revolving fork carriage that rotates 360° to accomplish such tasks as emptying scrap bins, dumping small parts from one bin into another, pouring ingredients into mixing or batching equipment, and loading tumblers. Bins used with the roto-Worksaver have short angle iron lugs welded

to their sides to form slots into which the forks of the truck fit. The slots permit the Worksaver to lift the bin to the desired dumping height, and to suspend it while the revolving carriage rotates to dump the load. The rotating mechanism is operated by a lever in front of the mast of the truck. The non-tilting Worksaver is available in 1000 and 1500 lb capacities. Fork elevation is 60-in. *Yale & Towne Mfg Co. For more information, check No.* 17 *on the attached postcard.*

Two-Way Fork Attachment

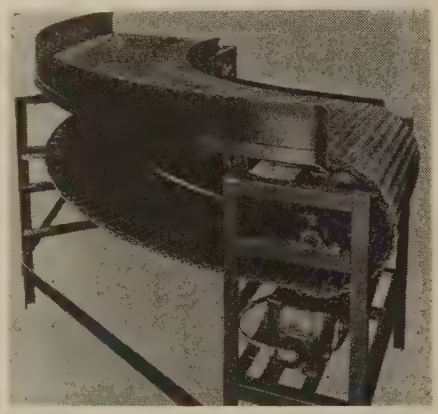
FOR upending and transporting heavily loaded steel barrels by means of power truck a three-prong fork used with a rotating head on the truck's lifting mechanism has proved satisfactory. It is useful for similar handling of other objects, the position of which is to be reversed from horizontal to vertical. When the barrel is standing upright the 18-in. single fork is pushed under it. The truck's upright column is tilted backward slightly and



the rotating head inclines the barrel against the 42-in. double fork, in which position it is transported. When the barrel is to be put down horizontally the rotating head revolves the double fork with its load to the lower horizontal position, and the tines are then withdrawn. The operation is controlled by the truck drive. The single fork is detachable and insertable at either side of the fork supporting plate. The double fork is adjustable out to 42-in. outside spread of the tines. Load capacity of the gas-electric power truck is 3000 lb. *Elwell-Parker Electric Co. For more information, check No.* 18 *on the attached postcard.*

Powered Flat Conveyer

THROUGH the use of a newly patented conveyer chain, a balanced weave wire mesh belt is guided around practically any curve, and wear on the edges of the belt is eliminated because they do not drag against guides. This Flat-Flex conveyer may be used in conjunction with other flat conveyers,



or the entire conveyer, including straight and curved runs, may be continuous. *Leeds Electric & Mfg. Co. For more information, check No.* 19 *on the attached postcard.*

Variable Speed Transmission

ALL speeds from 0 to 1100 rpm are made available by the new type F variable speed transmission. Produced in sizes from ¼ to 1 hp, this model is designed for vertical flange mounting. It has standard NEMA flange mounting dimensions and can be furnished with special shaft extension where required. Construction features spaced bearings on the output shaft with two tandem mounted oil seals to insure against oil leakage. Micrometer control is provided for accurate speed settings. Transmission is designed to maintain set speed with change in load and is suitable for motoring and proportioning uses or for mixing applications where change in viscosity occurs. Type F drive is available without motor or with built-in, open, or TENV, three

phase or capacitor start-induction run, 1800 or 3600 rpm motor. *Graham Transmissions Inc. For more information, check No. 20 on the attached postcard.*

Single-Solenoid Valves

SINGLE-SOLENOID valves for air pressures of 0 to 125 psi are offered in sizes ¼, ⅜ and ½ in. spring return. All sizes are available for 110, 220 and 440 v in both 50-60 and 25 cycle current. The valve has a one-piece bronze base, heavy and powerful solenoid for positive seating and cool operation, heavy sheet metal cover for protection, OU type packer and shock-resisting clevis and clevis pin. Models are two-way, three-way open and exhaust, three-way and four-way piped exhaust. *Valvair Corp. For more information, check No. 21 on the attached postcard.*

Stapling Hammer

A HEAVY - DUTY automatic stapling hammer features scientific balance to deliver the most powerful blow with a natural swing and least effort. It drives staples with a ½-in. crown and ¾-in. legs that diverge inside the work, putting them under tension and increasing their holding power. They do not vibrate out. This one-hand machine operates at arm's length. *Bostitch. For more information, check No. 22 on the attached postcard.*

Lift Kit

TO expedite grappling operations in automotive, marine and industrial applications, a new lift kit has been scientifically designed that combines weight distribution and balance with positive attachment through eye-bolts and eye-nuts direct to the unit being lifted. Eye-bolts and nuts are stamped to show safe load limits. Parts are specially hardened and cadmium plated. Kits have 1, 2, and 5-ton capacities. *Clayborne Mfg. Co. For more information, check No. 23 on the attached postcard.*

Steel Test Benches

BENCHES for use at test stations in metalworking plants are available in any length and in a variety of designs by joining prefabricated units. Eighteen different all-steel units include drawers, cupboards, sinks, tables, storage cases, etc. They are designed to be joined easily one to another to form test benches 30 or 36-in. high. Units are 2, 3, 4, or 5 ft long and have the new plastic-impregnated stone called Kemrock for bench working surfaces. *Fisher Scientific Co. For more information, check No. 24 on the attached postcard.*

Pipe Plugs

TWO new hex socket pipe plugs are pressure formed and threaded. Heads are cold drawn, retaining the full strength of the metal fibers. Pressure forming also makes a socket with smooth, perpendicular walls and with no chips at the bottom. This Dryseal pipe plug is designed for use with dryseal taps and was developed for use where a perfect seal is absolutely essential. It is threaded in accordance with Army-Navy Aeronautical Specification AN-P-363. Sizes range from 1/16 to 1¼-in. *Allen Mfg. Co. For more information, check No. 25 on the attached postcard.*

Magnetic Counter

DEVELOPED to meet limited specifications of certain types of machines which do not require an extremely high number of accumulated counts or high speeds, series 1268 magnetic counter is designed with five figures for direct reading. It may be built into equipment or machines as an integral part. This model is a non-reset type. In operation, the counter is actuated through electromagnets and they may be connected in series with any device having a contacting arrangement. Maximum speed is 50 counts per minute. Finish is aluminum and lubrication is not required. *Veeder - Root Inc. For more information, check No. 26 on the attached postcard.*

Wire Filter Cloth

WHERE chemical corrosion is a problem in screening and filtering operations, a new wire filter cloth made of Hastelloy provides resistance to that corrosion. Hastelloy alloys are high-strength, nickel-base alloys that withstand the action of nearly all acids, over a wide range of temperatures and concentrations. They are also highly resistant to such oxidizing agents as ferric chloride and wet chlorine. Two grades of filter cloth are available. *John A. Roebling's Sons Co. For more information, check No. 27 on the attached postcard.*

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

4c POSTAGE WILL BE PAID BY

THE IRON AGE
100 E. 42nd St.
NEW YORK 17, N. Y.

5/23/49

THE IRON AGE, New York 17, N. Y. 1

Send us additional information as circled below

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56

NAME ..... TITLE.....

PLEASE STATE BUSINESS.....

COMPANY .....

CO. ADDRESS .....

CITY ..... ZONE..... STATE.....

Information Free . . .

STEEL STRAPPING is reviewed in packaging catalog which features a number of strapping machines and contains numerous illustrations of these in use. Heavy duty models for palletizing are shown and also auxiliary equipment. *Gerrard Steel Strapping Co. For more information, check No. 28 on the attached card.*

SILICONE INSULATION for electrical equipment is the subject of a folder which contains charts and tables showing test results. Where it is specified and its numerous applications are described in detail. Illustrations are included. *Dow Corning Corp. For more information, check No. 29 on the attached postcard.*

BALL AND ROLLER BEARING 52-p catalog features a section on bearing selection and care. Manufacturing operations are described. Clutch release and ball thrust bearings as well as thrust washers, ball thrust retainers and special bearings and parts are illustrated with technical data on each. *Aetna Ball & Roller Bearing Co. For more information, check No. 30 on the attached postcard.*

PRECISION VALVES catalog No. 251 includes illustrations, descriptions, specifications and features of a complete valve line. Several new designs are included. Low pressure and hydraulic cylinders are also featured. *Hanna Engineering Works. For more information, check No. 31 on the attached postcard.*

POLISHING AND BUFFING machines, 10 junior automatic models for use with polishing and buffing lathes, are described in bulletin No. 10. Included are models with simple rotating spindles and models that have a stroke adjustment from 0 to 12 in. *Hammond Machinery Builders, Inc. For more information, check No. 32 on the attached postcard.*

GEAR catalog presents methods of reducing gear costs and improving products using gear assemblies. Eight case histories are given. These are said to be from actual jobs and cover in detail methods employed to achieve results. *Amgears, Inc. For more information, check No. 33 on the attached postcard.*

INDUSTRIAL COUNTER for use with arc welder, drill press or other power device, is the subject of folder. It may be actuated by electrical pulse or signal from a contact switch, photo tube and amplifier, or metal detector. *Streeter-Amet Co. For more information, check No. 34 on the attached postcard.*

STORAGE TANKS for gasoline, oils, water, paint, asphalt, alcohol and other liquids are featured in folder. Standard underground tanks are produced in capacities ranging from 550 to 4000 gal. Cutaway sections in photos show construction features. *Sharpsville Steel Fabricators, Inc. For more information, check No. 35 on the attached postcard.*

HEAVY DUTY CHASSIS of a special design for mounting cranes, clamshells, magnets, draglines and similar equipment is shown in folder. Three models with capacities from 10 to 25 tons are available. Plan drawings show features such as transmission, drive, differential and chassis. Power is obtained from crane motor. *Keystone Driller Co. For more information, check No. 36 on the attached postcard.*

AC ARC WELDER of 170 amp capacity is featured in bulletin which lists 12 construction and operating features. Specifications, operator's instructions and hints for obtaining good welds are included. The model is constructed for all types of welding within the capacity of a 5/32-in. welding rod. *Birdsell Mfg. Co., Inc. For more information, check No. 37 on the attached postcard.*

ABRASIVE PAINT featured in bulletin is recommended for control of slipping problems inside and outside buildings. Its application is described in detail with typical industrial areas where it is used illustrated. It is also recommended for manufactured products and is available in colors. *Frost Paint & Oil Corp. For more information, check No. 38 on the attached postcard.*

SPRAWLED WIRE described in catalog is a hard facing wire for a precision hard facing method which is said to combine welding and metallizing procedures. The wire, which is fully discussed in this publication, is designed for use in standard metallizing guns. Application instructions and other information is given. *Wall Colmonoy Corp. For more information, check No. 39 on the attached postcard.*

CHEMICAL DIP TREATMENT for iron, steel zinc and cadmium is explained in folder which contains pictures of test panels. The process known as Irco-Izing is described as increasing the life of any paint finish applied over the above mentioned metals. It may also be employed as a final finish. *International Rustproof Corp. For more information, check No. No. 40 on the attached postcard.*

METAL FABRICATION — the company's experience and facilities in the fabrication of standard and special equipment and apparatus for processing, material handling and storage for industry, is explained in brochure. Two plants are equipped for handling metals in thickness from 18 gage to heavy plate. *L. O. Koven & Brother, Inc. For more information, check No. 41 on the attached postcard.*

MINIATURE BURS of tungsten carbide are illustrated and described in leaflet. They are extremely small and are designed for machining operations which are difficult to perform with standard size tools. The burs cut any material up to 66 Rc and have eight flutes for correct cutting balance to eliminate drift. *Kerr Mfg. Co. For more information, check No. 42 on the attached postcard.*

6/23/49

THE IRON AGE, New York 17, N. Y. **2**

Send us additional information as circled below

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56

NAME ..... TITLE.....

PLEASE STATE BUSINESS.....

COMPANY .....

CO. ADDRESS .....

CITY ..... ZONE..... STATE.....

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L.&R.)
New York, N. Y.

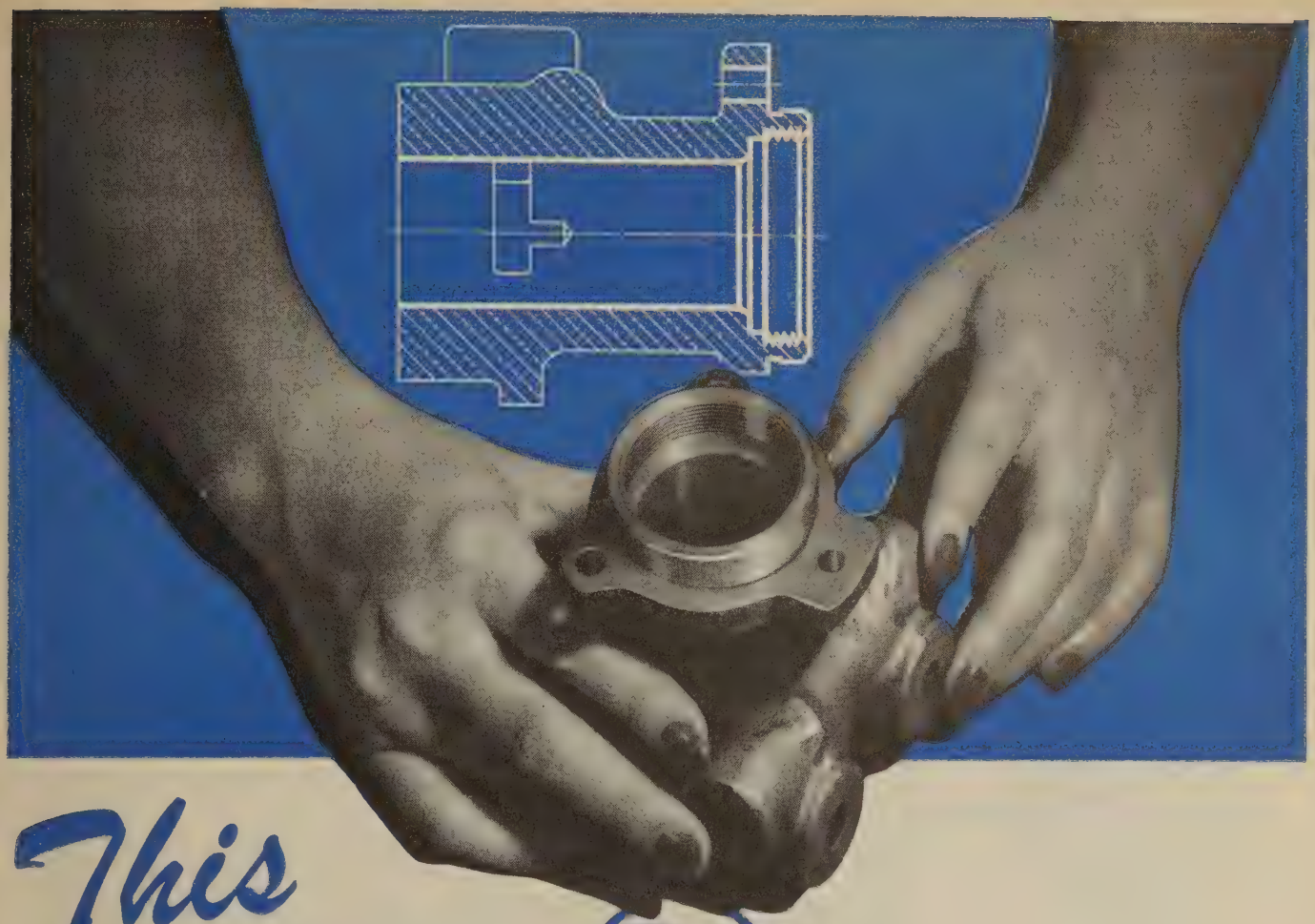
BUSINESS REPLY CARD
No postage necessary if mailed in the United States

4c POSTAGE WILL BE PAID BY

THE IRON AGE

100 E. 42nd St.

NEW YORK 17, N. Y.

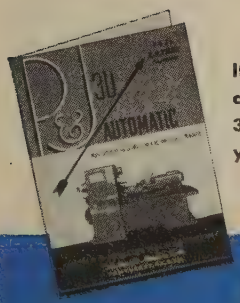


This IS THE RESULT OF P&J PRECISION TOOLING

— a pump housing, just as it comes from the P&J Automatic. Heavy lines in the drawing indicate the 17 exacting operations completed in record time with tungsten carbide P&J-engineered Tooling . . . boring, turning, facing, chamfering, reaming, threading . . . and a clever P&J multiple drill head setup for the three holes in the flanges.

The machine? It's the P&J 3U Speed Flex — smallest of the line of P&J Automatic Turret Lathes — which takes very little floorspace . . . operates with 48 changes of speed from 72 to 1420 rpm for the class of work up to 6″ diameter . . . and features fully automatic operation to take fullest advantage of ingenious P&J Tooling.

Even if your work is beyond the 6″ class, the skill and know-how of P&J Tooling specialists can work out a profitable tooling setup. Send us a sample part or prints, regardless of size, to prove how P&J Tooling will produce more quality parts with fewer rejects, at lower cost.



If your quantity production is within the 6″ class, you will want this Bulletin on the P&J 3U Speed Flex Automatic. Just write for it on your Company letterhead.

Potter & Johnston Company
Pawtucket, R. I.
subsidiary of Pratt & Whitney
Division Niles-Bement-Pond Company

PRODUCTION TOOLING HEADQUARTERS

Assembly Line . . .

WALTER G. PATTON

• Council of Profit Sharing Industries presents its views on profit sharing . . . Trade association representing 200,000 employees takes issue with many union claims.

DETROIT — In the Assembly Line, Apr. 21, 1949, the UAW-CIO position on profit sharing as set forth in "Ammunition," a union publication, was published.

The Council of Profit Sharing Industries, an association of employers with over 200,000 workers, has asked THE IRON AGE to let them present their point of view on this same subject.

THE IRON AGE is pleased to grant this request of Executive Secretary Joseph B. Meir, First National Bank Tower, Akron, Ohio.

Among the officers and directors of the council are executives of the following companies: Quality Castings Co., Orrville, Ohio; S. C. Johnson & Son, Racine, Wis.; American Cast Iron Pipe Co., Birmingham; Pacific Screw Products Co., Southgate, Calif.; Hankins Container Co., Cleveland; Daisy Mfg. Co., Plymouth, Mich.; Lincoln Electric Co., Cleveland; Dominion Foundries & Steel, Ltd., Hamilton, Ont., and Arwood Precision Castings Corp., Brooklyn.

* * *

"Our answers to the objections raised by the article are cited in the order appearing in your article."

(1) *Lack of stability of income for the worker.* "The members of our council endeavor to pay prevailing rates of wages in their communities. The amounts distributed in profit sharing are over and above the going rates; therefore, any shrinkage or entire lack of profits leaves the worker at least as well off as other workers in the community. The worker may receive a bonus similar to that received by members of the Textile Workers Union of America—CIO at the American Velvet Co., of Stonington, Conn. The cash bonus at this company in 1948 amounted to 26 pct of regular wages and, in addition, over 13 pct in deferred payments towards a pension fund. In other words, profit sharing amounted to nearly 40 pct more than the regular union rates of pay. This is only one case; we could cite many others. Since profit sharing payments are not a part of wages, the argument of reduced pay rates is fallacious."

(2) *Profit sharing means profits first.* "The unions claim management comes first in most profit sharing plans. This is contrary to fact and the evidence in both the council's 'Profit Sharing Manual' and the National Industrial Conference Board's study, 'Profit Sharing for Workers.' The council defines profit sharing as any procedure in which an employer pays to all employees, in addition to good rates of regular pay, special current or deferred sums, based not only upon individual or group performance, but on the prosperity of the business as a whole."

(3) *Profit sharing plans are not stable.* "A report which the National Industrial Conference Board published in 1937 is still being quoted, although the same Conference Board published a 1948 report citing that out of 202 companies (the 1937 report was on 161 companies) only 35, or 17 pct, were discontinued. The following is a copy of Table No. 42, which appears on page 32 of the Conference Board's report. This does not substantiate the statement made in the article in IRON AGE.

Major Causes of Discontinuance of Profit Sharing Plans
1937-1947

Reasons for Discontinuance	Companies No.	Companies Pct	Deferred Distribution Plans	Current Distribution Plans
Unfavorable employee Reaction				
Employee dissatisfaction or indifference	3	8.6	—	3
Employee preferred amount in pay envelope	2	5.7	—	2
Union attitudes	7	20.0	—	7
Company dissatisfaction				
Believe other method of compensation better	3	8.6	—	3
Replaced by other benefits	2	5.7	1	1
Other Causes				
No profits or reduced profits	5	14.3	—	5
Wartime conditions	4	11.4	—	4
Government rules and regulations	5	14.3	1	4
Out of business or merger	2	5.7	2	—
No explanation	2	5.7	—	2
TOTAL	35	100.0	4	31

(4) *Profit sharing is a step backward.* "Since the records of success of companies with profit sharing plans are better than the record of business as a whole, it must of necessity be a better risk. Just how it brings uncertainty was not elaborated on from the unions' viewpoint."

(5) *Wage advantages at the expense of the worker's health.* "The implied position here is that profit sharing's only objective is a speedup. Results from profit sharing are not found in speedups, but accrue from a sense of partnership, team spirit, and genuine cooperation. They do develop the elimination of waste, carelessness, and general lack of overall interest. It is of course understood that a fair day's work will be given in return."

(6) *Too much depends on what management does.* "Obviously it is management's function to run the business profitably. But it does not follow that it is more important what management does when they have a profit sharing plan than

for your information

the BULLARD complete line

CUT MASTER VERTICAL TURRET LATHES
SIX SIZES 30", 36", 42", 54", 66", 74"

MAN-AU-TROL VERTICAL TURRET LATHES
SIX SIZES 30", 36", 42", 54", 64", 74"

MAN-AU-TROL HORIZONTAL LATHES
MODEL 30-H 3 SPINDLE

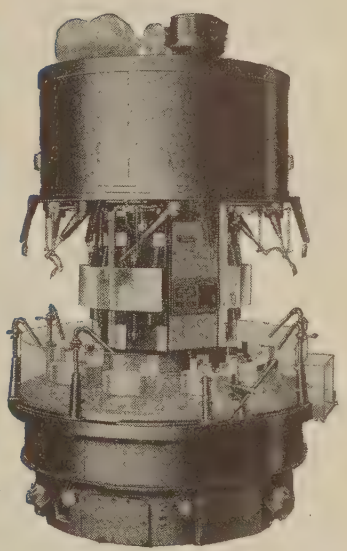
MULT-AU-MATIC Type "D"
8", 12", 16" WITH 6 OR 8 SPINDLES 16-23" 8 SPINDLES

CONTIN-U-MATIC Type "R.D." "R.D.H."
(NOT SHOWN)

MULT-AU-MATIC Type "K"
9½ TO 10¾ CAPACITY 6-8-12 OR 16 SPINDLES (NOT SHOWN)

BULLARD SPACER 2 Sizes
30 x 20 AND 4 x 4 (NOT SHOWN)

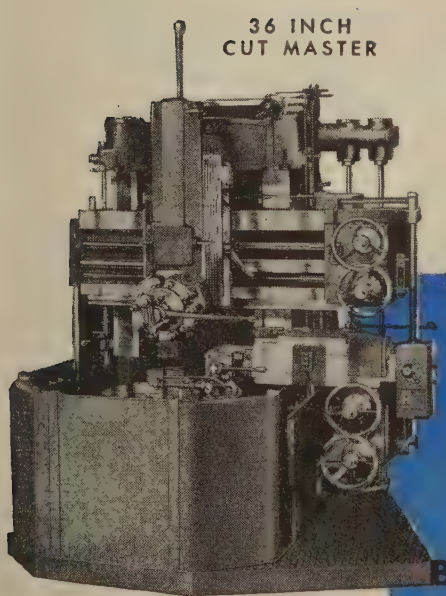
BULLARD UNIVERSAL BORING MACHINE
IN SIZES 3", 4", 5" SPINDLES (NOT SHOWN)

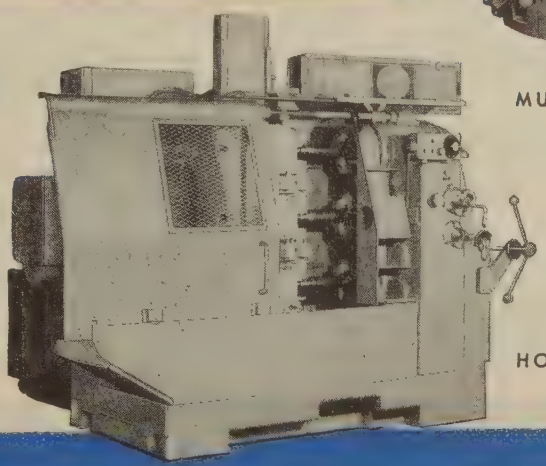


TYPE "D" MULT-AU-MATIC

BULLARD

36 INCH CUT MASTER





30-H HORIZONTAL LATHE

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

when they do not. Quality and quantity of output are directly related to the worker's effort and in great measure affect the progress of the company and its profits."

(7) *Labor's reward is too small.* "The Council of Profit Sharing Industries challenges this statement. Many of our companies give more in additional payments to workers than stockholders received in dividends, and many run to 20 pct, 40 pct and even greater increases over regular wages earned by the individual on incentives or hourly rates of pay."

"Unions honestly motivated have nothing to fear from profit sharing. The many union operated shops with profit sharing plans who are working harmoniously and incontestably with management prove this fact."

"That some profit sharing plans are not all they should be is no more reason for condemning all profit sharing plans than to blanket all union members as racketeers and Communists because a very few may be. In fact, it is amazing to see the similarity of the 'Goals of Unions,' as set forth in the recent book, 'Partners in Production,' with the objectives of the Council of Profit Sharing Industries. We invite the UAW to investigate further.

■

Correction: A photo caption appearing in IRON AGE, June 9, p. 78, referred to the new Dodge Roadster as having the lowest price of any full sized American car. This should have read: lowest priced of all full-sized American-made *open* cars.

States GM Plans

Detroit

• • • **Unless a steel** strike interferes, General Motors plans to build a million cars and trucks through September.

However, C. E. Wilson, president of GM, said that the September schedule might be wiped out if a steel strike occurs. He did not believe that a coal stoppage would seriously interfere with GM's production schedules. Both Mr. Wilson and Alfred P. Sloan, Jr., GM board chairman, agreed there is apparently no good reason for a prolonged business recession in this country. But, Mr. Wilson said, "there are storm signals flying."

Mr. Wilson said that GM corporation for the first time is turning out cars at peak capacity of 12,500 cars and trucks a day which was planned following the war.

At the first sign we cannot sell our cars, he said, GM will cut its schedules.

Messrs. Sloan and Wilson spoke at a dinner attended by nearly 400 Motor Holding alumni who are in Detroit this week for a 2-day visit.

•

Testimonial Dinner for GM

Detroit

• • • **"Little Business"** paid a unique compliment to "Big Business" in an unusual testimonial dinner here this week. More than 400 General Motors' dealers from all parts of the country who received their start in business as a result of loans from Motors Holding Div. of General Motors awarded special illuminated testimonials to Alfred P. Sloan, Jr., chairman of the board of General Motors, and Donaldson Brown, board member, for offering financial aid to them as auto dealers

General Motors Holding Div. was established 20 years ago to give financial assistance to prospective dealers who were "long on ability but short on capital." Dealers repay the loans out of earnings after which the money becomes available to some other worthy prospective dealer.

•

April Car Registrations

Detroit

• • • **Close to an** all-time record for new passenger car registrations may be reached in April when total registrations are expected to exceed 400,000, according to R. L. Polk & Co., Detroit statisticians for the automotive industry.

Polk officials estimated that 404,000 new cars would be titled during the month, basing their estimate on registrations already received from 42 U. S. states.

Top all-time record for the industry was May, 1941, when 515,034 new cars were registered.

Polk estimates that new truck sales during April will reach 80,000 units.

•

Tells of Government Costs

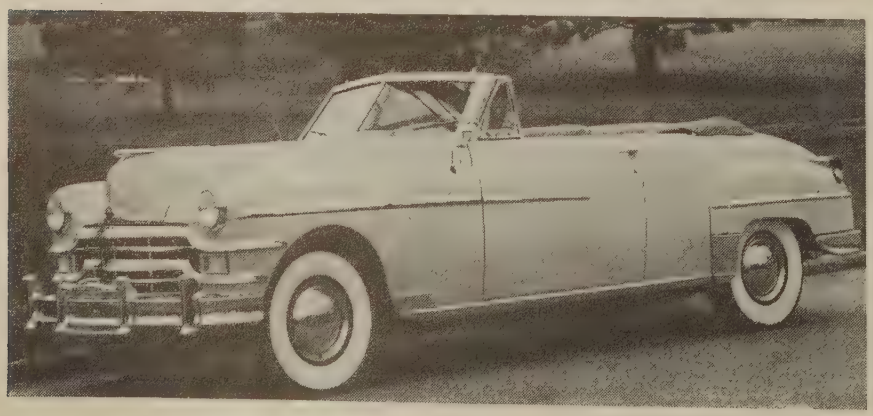
Detroit

• • • **Government costs** too much in America, Leonard E. Read, president of the Foundation for Economic Education, told 100 automotive executives at the annual meeting of the Automobile Manufacturers Assn. in Detroit.

According to Mr. Read, U. S. Government takes 29 pct of all earned income. About two-thirds of this 29 pct tax burden or about $1000 a year for the average family, is in the form of hidden taxes, Mr. Read said. He estimated there are 502 taxes on a pair of shoes alone.

"When all of these hidden taxes are brought to life, one finds that he nows works 3½ months for the government leaving one 8½ months to work for himself," Mr. Read asserted.

LATEST CONVERTIBLE: *Shown here is Chrysler's 1949 convertible which was recently introduced to the public. The new model has a long—131½-in. —wheelbase and is equipped with Prestomatic fluid drive transmission. It is available in six-cylinder Windsor and eight-cylinder New Yorker models. A specially designed plastic window containing approximately 774 sq. in. provides plenty of visibility for the driver.*



WIRING HARNESS ASSEMBLIES *by Auto-Lite*

Saves Measuring
Saves Cutting
Saves Fitting
Saves Time
Saves Assembling
Saves Stripping

. . . the answer to wiring problems in mass production

Auto-Lite offers complete facilities for designing and building wire assemblies. If you already use harness, send a sample with quantities and schedule desired. When a new design is needed, assistance is available from Auto-Lite engineers. Detailed information is contained in a free Auto-Lite Catalog. For your copy, write to

THE ELECTRIC AUTO-LITE COMPANY
Port Huron *Wire and Cable Division* Michigan

AUTO-LITE MEANS PRECISION MANUFACTURING

AUTO-LITE *Electrical* WIRE and CABLE

TUNE IN "SUSPENSE!" . . . CBS RADIO NETWORK THURSDAYS . . . CBS TELEVISION TUESDAYS

Washington . . .

EUGENE J. HARDY

• T-H Act may remain on statute books . . . St. Lawrence Seaway bill proposed by Mr. Lucas . . . Chances of passage no brighter than before . . . Oil industry not worried about steel.

WASHINGTON — While the picture regarding labor legislation is still none too clear, it appears that the Taft-Hartley Act has a slightly better than outside chance of remaining on the statute books when the first session of the 81st Congress closes up and the members head for home for a none-too-well-deserved vacation.

Should this situation come about, the primary reason would be lack of time for Administration leaders to bring out a bill that the President would sign. Actually, the White House was unable to revive labor legislation after the Administration suffered its crushing defeat in the House. Revival was brought about by labor pressure, largely from Phil Murray of the CIO.

The only kind of legislation which has any chance of getting to the White House is a compromise of the broadest sort, which would not satisfy any one of the conflicting elements on Capitol Hill. Even such a compromise will not come out of Congress without one of the bitterest legislative fights witnessed in Washington in many years. This has been made abundantly clear in the floor debates in the Senate where the various proposals are now under consideration. The Southern Democrats are almost solidly opposed to any major changes in the T-H Act. The Senate Republicans are pretty well split. The outlook is for Senate passage of a bill along the lines proposed by Senator Taft, R., Ohio, retaining many of the important provisions of the T-H Act.

FOR example, one of the issues which clearly illustrates the necessity for compromise is the "plant seizure" provision which might be acceptable in some labor circles in order to get away from court injunctions. But plant seizure in peacetime, however, is very different from the government's tight control of practically everything during wartime. Conceivably, the government could write a contract involving a seized plant suitable to labor. In time of war, industry has little choice but to accept such a contract. In time of peace, however, industry would probably balk at accepting a government-written contract and when the plant is returned, strike conditions would probably prevail again. In addition, the problem of compensation and profits would have to be worked out. This is only one of the many thorny problems that will bedevil Congress before a bill can be sent to Mr. Truman.

Senate-approved legislation would undoubtedly be rewritten along Administration lines in the House Labor Committee, headed by pro-labor Representative Lesinski, D., Mich. On the floor, the House would start restoring Senate provisions, eliminating the pro-labor, pro-Administration tinge.

The end result would be the writing of the labor bill by a House-Senate Conference committee. The bill will without question be cut to pieces by the conference committee before anything acceptable to both Houses can be agreed upon. "Cut" is the proper terminology in this case, since conference committees can cut out but cannot add to the bills.

Assuming that Congress can weather all of this haggling before adjournment, the bill that will reach the President will almost certainly be one that Mr. Truman will not be able to sign, provided he continues his stand-pat attitude regarding repeal of the T-H Act.

The T-H Act would then remain on the books, unchanged, thereby carrying the issue into next year's congressional elections, which some observers say is what Mr. Truman wants or at least does not seriously object to.

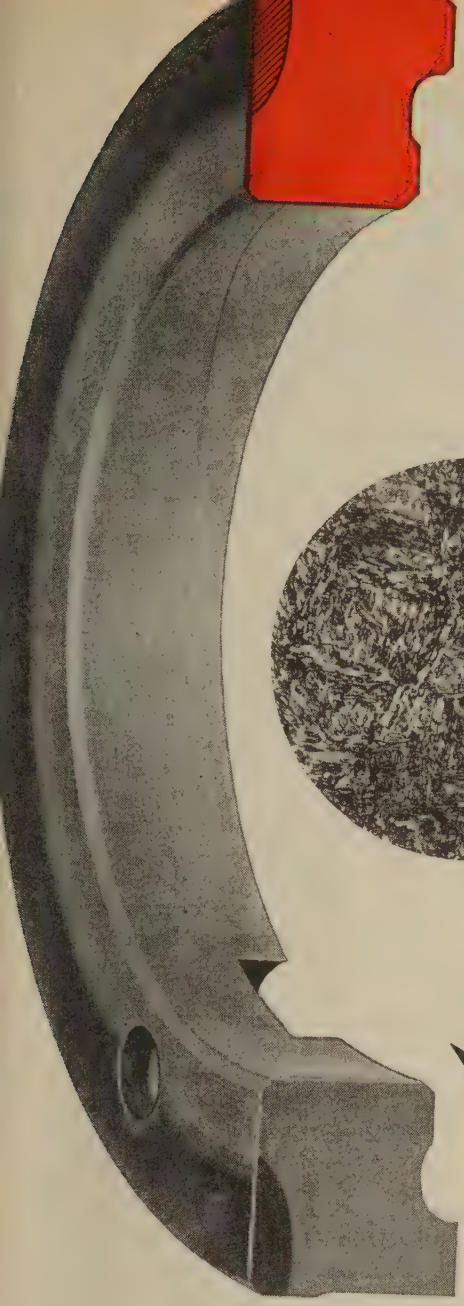
* * *

SENATE Majority Leader Lucas, D., Ill., has gotten on the St. Lawrence Seaway bandwagon. Joined by a bi-partisan group of Senators, 12 Republicans and 7 Democrats, Senator Lucas recently introduced a bill calling for completion of the project on a self-liquidating basis involving payments of tolls which would not exceed $1.25 per short ton. However, introduction of the measure by the Administration leader in the Senate should not be interpreted as a sign that an all-out fight will be made for passage at this session, rather it indicates his interest in the project as a Midwestern legislator.

Despite the falling off of some opposition and the gaining of a few new converts, the chances for Congressional approval of the project at this session are no brighter than they have been in past years.

Senator Lucas in introducing the measure used as one of his primary arguments the need for the Seaway as a means of transporting iron ore from Labrador to the United States, an argument that will continue to be pushed to the forefront by advocates of the project.

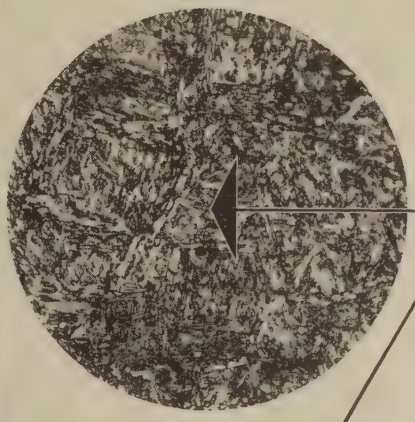
"By developing the St. Lawrence Seaway, we have an excellent opportunity to utilize the natural resources of the North American continent on a greater scale than



specified

This area to be hardened

production 120/hr-results uniform and 100% predictable



achieved

This surface structure RC58
(X600 2% nital etch)

by flamatic selective surface hardening

This clutch adjusting nut (8¼" OD, 5½" ID – SAE 1050) is Flamatic-hardened by **Rockford Clutch Division, Borg-Warner Corp.,** in less than 30 seconds – to a specified surface hardness (Rc58) – to a specified depth – and virtually to a specified microstructure.

Behind this ability of Flamatic hardening to duplicate these results in production are three simple facts:

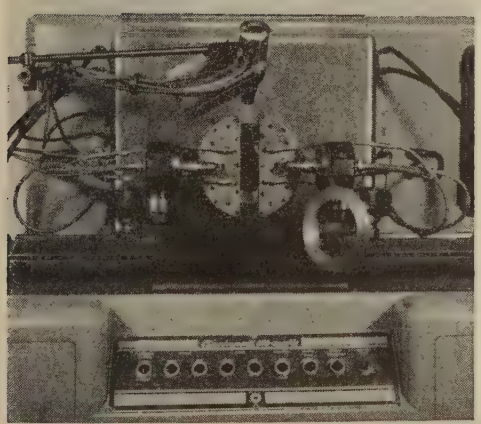
(1) Flamatic high temperature flames deliver heat to the part so rapidly that hardness can readily be confined to definite areas.

(2) Flamatic electronic temperature control maintains an absolute instantaneous measure of work piece surface temperature, permitting the part to be heated to within plus or minus 10° F of the specified value.

(3) Oil quench minimizes and often entirely eliminates distortion.

Gears, and similar parts up to 18" OD, shafts up to 24" long – simple or complex parts, many which cannot economically or uniformly be hardened by any other method – are all within Flamatic's capacity.

Send a description, sketch or print of any part you are now hardening, for analysis and recommendation. Interesting booklet of case histories (Publication No. M-1658) on request.



After loading, Flamatic operation is fully automatic. Set up for a given part is easily done without special skill.

flamatic

THE CINCINNATI MILLING MACHINE CO

Cincinnati 9, Ohio, U. S. A. • CINCINNATI

ever before," Senator Lucas said. "The tapping of this rich Labrador ore field is one instance of what the Seaway will mean to the people of the United States and Canada."

* * *

THE oil industry, in the doldrums a year ago because of the lack of steel, will have nothing to worry about this year except, perhaps, spotty supply problems involving line pipe. Line pipe makes up only about a seventh of the industry's 1949 steel needs.

Taking a second look at its current requirements recently, the National Petroleum Council found that its 1949 requirements as estimated a year ago still held good. It also found that in 1948—when there was a real steel shortage—that shipments of steel to the oil industry just about equaled the amount needed this year.

As it now stands, the council says, there are still individual areas and cases where the industry cannot get specific steel items when and where it wants them. But in most cases, it gets the steel it wants without serious hardship or delay.

For instance, the industry figures that it takes about 39 tons of oil country tubular goods per well drilled. Current estimates by the Commerce Dept. places 1949 production at as much as 1,700,000 tons which, on the basis of an estimated 38,000 new wells to be drilled this year, means an excess output of at least 200,000 tons.

Also, American oil companies in foreign nations (50 pct or more United States capital invested) have found it necessary to reduce downward previous estimates of 1949 steel requirements.

Outside the United States, oil production has now exceeded foreign consumption and in various instances the output has had to be cut back because of lack of outlet. As a result, estimates of 1949 steel needs for oil production have been reduced by 25 pct for the Western Hemisphere and by 10 pct for the Eastern Hemisphere.

In tonnage, this means that American companies abroad will need 195,000 tons less steel for oil production than originally estimated.

ECA Approves Funds For Expansion French Iron, Steel Production

Washington

• • • **An extensive** program of modernizing and expanding iron and steel production at Hayange and Ebange in France with the aid of Marshall Plan funds has been approved by the Economic Cooperation Administration.

The project is being carried out by Sollac/Societe Lorraine de Laminage, a new entity organized and owned by eight Lorraine iron and steel companies and one Saar company. All the companies are under French management and of French majority ownership.

It is proposed to carry out the development and modernization program in two phases, the first of which would have an equivalent overall dollar value of $62,820,000 including $29,820,000 in ECA assistance funds for purchase of equipment in the U. S. The second phase would involve an equivalent overall dollar value of $70,240,000 including $19,540,000 in ECA funds for equipment purchases in the U. S.

First stage of the development would involve the construction of an 80-in. continuous hot strip mill with an annual capacity of 700,000 to 850,000 tons of coils, and the construction of a 5-stand, 48-in. continuous cold strip mill with an annual capacity of 350,000 tons.

The second stage proposes an 84-oven coke plant to supply existing blast furnaces at Hayange, new crude steel capacity of 500,000 tons per year, a new blooming mill to handle the requirements of the 80-in. hot strip mill, and a new continuous cold strip mill.

In the first stage, the participating companies will supply the steel which Sollac will roll from its own facilities. When the new openhearth furnaces, Bessemer converters and blooming mill are completed, these companies will provide the pig iron necessary for Sollac's operations.

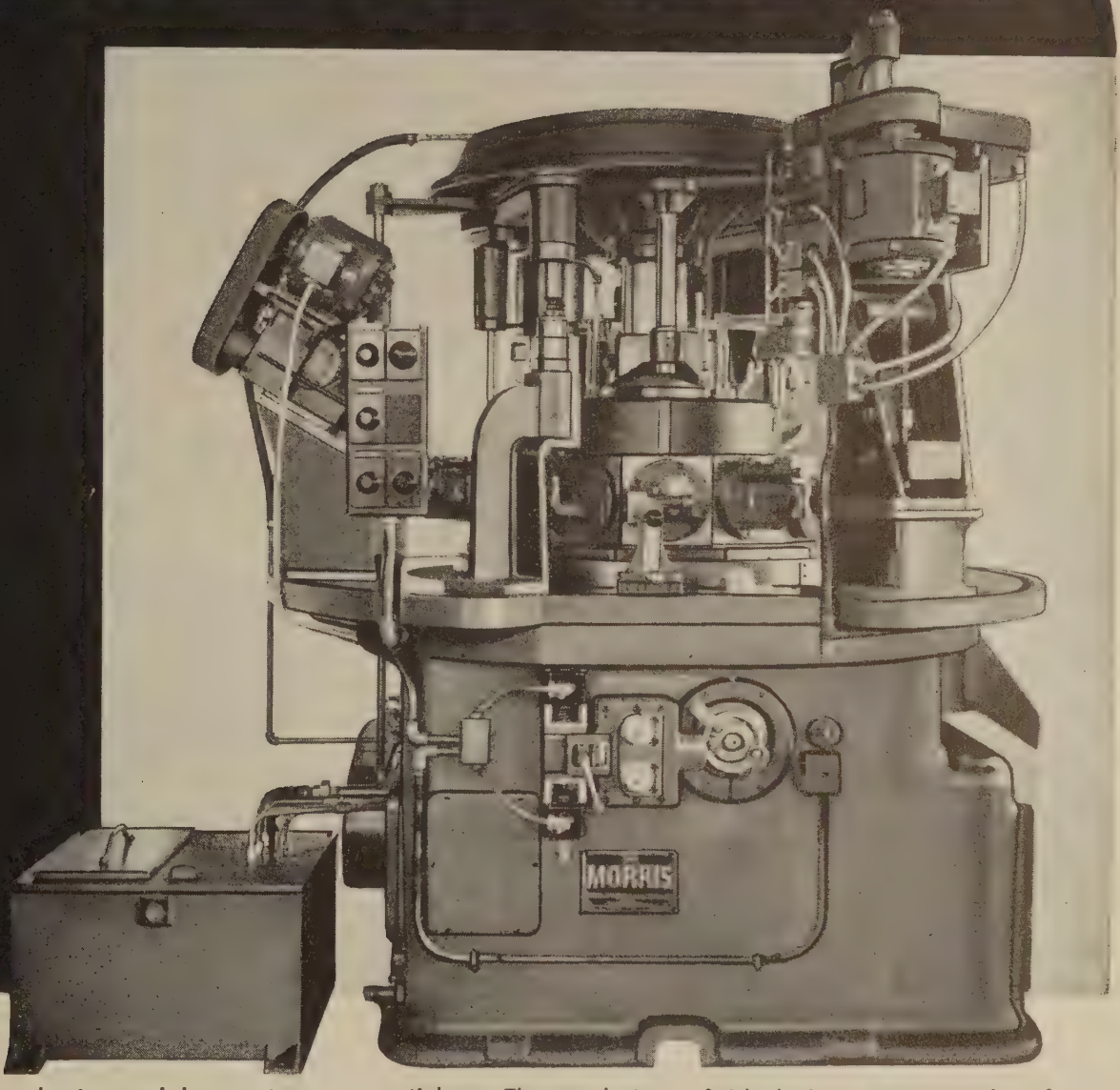
The second stage of the project will get under way within a year after the start of initial construction work. On completion, planned for 1952, the Sollac development and its allied facilities will represent a modern sheet and tinplate installation, integrated with adequate steel, iron and coke production.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

THAT KID IS GREAT ON CRANES AND WE'D LIKE TO SEND HIM TO AUSTRALIA TO INSTALL THIS JOB, BUT HE'S TOO YOUNG LOOKIN' AN' THEY'LL THINK WE-- WELL--
YEH, IF ANYTHING GOES WRONG THEY'LL SAY, "NO WONDER-- YOU HIRE KIDDIES!"
DON'T TELL ME THESE FAST EDUCATIONS PUT YOU AHEAD FAST! A LOT OF BRIGHT BOYS ARE WAITIN' FOR WRINKLES WHILE THEIR WIVES ARE MAKIN' THE WRINKLES WAIT!
DETAIL 1001
250 TON CRANE
J.R.WILLIAMS
6-24
THE HANDICAP
COPR. 1949 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

Production is Automatic on this

MORRIS MOR-SPEED Production Machine



● High production and low costs are essential under prevailing conditions today. To help you meet these conditions at favorable costs Morris has developed a line of Mor-Speed Production Machines.

Each machine is designed to handle a specific job and to obtain maximum production.

For example the Morris center column machine illustrated performs six operations—drilling—reaming—facing—spot facing—chamfering—and tapping simultaneously on automotive carburetor air horns. Thus producing a finished piece at every index of the fixture holding table.

Production is continuous as the twelve fixtures index automatically and operator unloads finished jobs and loads new piece at each index of the table.

If you are interested in high production and low costs consult Morris—they have the engineering experience and manufacturing "know-how" to design and build equipment to meet your specific job needs.

Write for complete details.

Builders of MOR-SPEED *Lines*

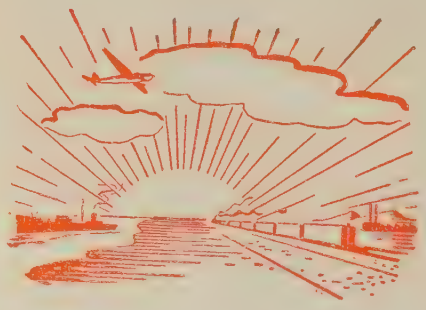
The MORRIS *Machine Tool Co.*

CINCINNATI 3, OHIO

West Coast .

ROBERT T. REINHARDT

• New Utah coal reserve of 30 million tons proved for Kaiser . . . West's only aluminum foil mill opens . . . Oil tool slump affects Los Angeles foundries.



SALT LAKE CITY — Coking coal reserves of approximately 30 million tons have been added to the holdings of Kaiser Co., Inc., it has been revealed by test drillings in central Utah.

These coal deposits have been proved in 2560 acres of land which the Kaiser Co. leased last year from the U. S. Dept. of the Interior over the protest of U. S. Steel Corp. which had sought to lease this property but was prevented from doing so because of acreage limitations. This government land is about 24 miles east of Price, Utah, and carries coal seams of from 11 to 14 ft in thickness.

Kaiser already has an estimated reserve of 23 million tons of high-grade coking coal in its Sunnyside leases and this new reserve will be counted upon heavily to supply the 45 new byproducts coke ovens now under construction at Fontana, Calif. The company also has recently been granted a lease by the state of Utah on 480 acres of coal lands near the larger federal government property. This is the area in the Book Cliffs field which has been supplying the Geneva Steel Co. with coking coal.

It is estimated that this new field will not be tapped for at least a year as it will probably take that long to install the necessary facilities to open it up. In the interim the old Sunnyside mine will continue to supply coal to both the old 1200-ton blast furnace at Fontana and the new one which is expected to be blown in late this year. It is reported that the company has approximately a 2½ months' supply of coal now in stock at Fontana against the possibility of a prolonged miner's strike.

Geneva Steel Co. near here has the largest stock pile of coal it has ever been able to accumulate and it is estimated capacity operations could continue for at least 90 days in the event of a mine shutdown. Commercial mines were generally down to 2 days a week and the seasonal pickup is not expected to start until late in July, so for a large number of the miners a week's mining holiday involved loss of only 2 days' pay.

Geneva has one blast furnace down for minor repairs and three of the nine openhearths are temporarily idle. The structural mill has been cutback to one turn per day but the plate mill is still operating at capacity. Demand for structural shapes has declined sharply but the plate market is still strong so far as Geneva is concerned and it is expected that the production of hot-rolled coils for use at the cold strip mill of Columbia Steel Co. at Pittsburg, Calif., will be stepped up if the plate volume diminishes. There have been no layoffs of employes as vacations are absorbing any excess manpower for the time being.

The nonferrous metals picture is still murky with mine operators proposing that the miners take a wage cut, but the bargaining agents are asking for a substantial increase to wipe out or minimize the reduction in take home pay resulting from the cutback from 48 to 40 hr per week.

•

West's Aluminum Foil Mill Starts Production

Permanente, Calif.

• • • **Although** not yet in full production, the Permanente Metals Corp. last week took the wraps off of its aluminum foil rolling mill here.

Basic equipment was purchased from the U. S. Government under German reparations agreement in December 1947 for $203,000 and has been completely rebuilt to increase its efficiency and capacity at an estimated total cost of $1¼ million. Principal units are three lines of five cold reduction mills each, with an additional washing mill at the end of one line. Total capacity is estimated at from 500,000 to 750,000 lb of foil per month depending upon thicknesses produced, and at present operations are running at about 100,000 lb per month.

This is the only foil mill west of the Mississippi and Permanente is the seventh aluminum foil producer in the field. Others are Reynolds Metal Co., Richmond, Va.; Aluminum Co. of America, New Kensington, Pa. and Pittsburgh; Cochran Foil Co., Louisville; Johnston Tin & Lead Foil Co., St. Louis; Stranahan Foil Co., Hackensack, N. J.; and Republic Foil Co., Danbury, Conn.

Permanente engineers and the Loewy Construction Co. of New York redesigned all of the machinery to double its capacity and pilot production began in March. At present most orders are for relatively small quantities of foil as this entrepreneur enters this market. A $25,000 laboratory is to be built which will provide facilities for customer assistance and possibly development of new uses for aluminum foil. The company states that it has no plans to go into the conversion business and it will confine its distribution to supplying converters.

At full capacity this plant could provide approximately 8 to 10 pct of the aluminum foil market of the country.

Coils of 0.026-in. aluminum sheets weighing 500 to 800 lb are supplied the local plant from the Trentwood Rolling Mills of the company and this stock is reduced to thicknesses of as low as 0.00025-in. in varying widths up to a maximum of 31½-in.

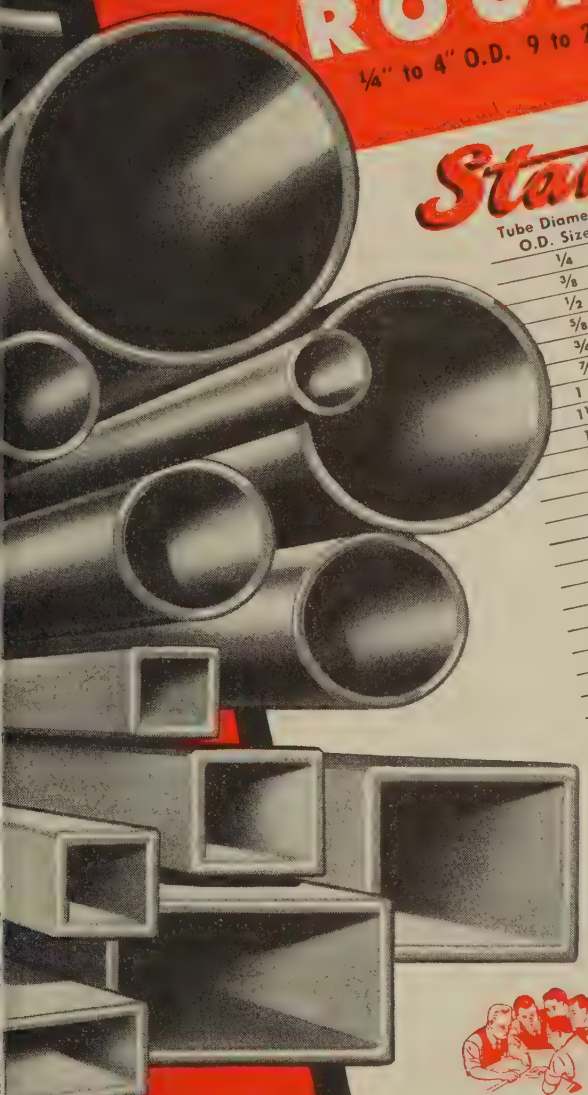
After the cold-rolling process is

Michigan WELDED STEEL TUBING

The Modern Electric Resistance Welded Steel Tubing
Straight or Fabricated to your specification

ROUND SQUARE-RECTANGULAR

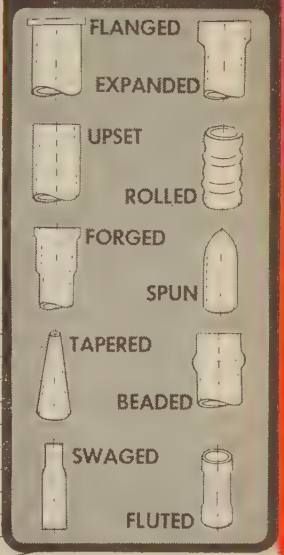
¼" to 4" O.D. 9 to 22 gauge ½" to 2" gauge 20 gauge 1" to 2¾", 14, 16, 18 gauge



Standard Sizes

Tube Diameter O.D. Size	Maximum Wall BWG Decimal	Maximum Wall BWG Gauge	Minimum Wall BWG Decimal	Minimum Wall BWG Gauge
¼	.049	18	.028	22
⅜	.065	16	.022	24
½	.083	14	.022	24
⅝	.095	13	.022	24
¾	.095	13	.022	24
⅞	.095	13	.022	24
1	.095	13	.028	22
1⅛	.095	13	.028	22
1¼	.095	13	.028	22
1⅜	.095	13	.028	22
1½	.120	11	.035	20
1⅝	.120	11	.035	20
1¾	.120	11	.035	20
1⅞	.148	9	.035	20
2	.148	9	.035	20
2⅛	.148	9	.035	20
2¼	.120	11	.035	20
2⅜	.148	9	.035	20
2½	.120	11	.035	20
2⅝	.148	9	.035	20
2¾	.148	9	.049	18
2⅞	.148	9	.049	18
3	.148	9	.049	18
3⅛	.148	9	.049	18
3¼	.148	9	.049	18
3⅜	.148	9	.049	18
3½	.148	9	.049	18
3⅝	.148	9	.065	16
3¾	.148	9	.065	16
3⅞	.148	9	.065	16
4	.148	9	.065	16

Can be BENT also . . .



Men of Vision, keep America a free country, a country of men unafraid to change old methods, a country of progress best exemplified by the continued improvements in product manufacture. In hundreds of applications product improvement has been achieved by the use of Michigan welded steel tubing. For reasons of design simplification, fabricability, uniformity, ductility, ease of assembly and installation, Michigan tubing cannot be surpassed.

Our engineers are at your service to consider the adaptability of Michigan tubing to your product. Address your inquiries to:

Michigan STEEL TUBE PRODUCTS CO.

More Than 30 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN

FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Drummond, McCall & Co., Ltd., Toronto, Canada.

completed coils of foil are annealed in electrically heated ovens at temperatures of 400° to 800°F to make it pliable and soft for commercial use as wrappings and in scores of other applications.

Chief personnel of the company is: Henry J. Kaiser, president; D. A. Rhoades, vice-president and general manager; T. J. Ready, assistant general manager of aluminum division; F. J. Drewes, foil plant manager; and E. G. Popple, plant superintendent. Mr. Popple has been associated with foil producers for 29 years and was formerly with the British-American Tobacco Co. in Shanghai, China, and Dominion Falls of Canada in P. Q. Foil sales are under the direction of Ashton Smith under S. S. Inch, general sales manager of Permanente Products Co., the sales organization for the aluminum division. Charles Reynolds has been superintendent of installation of the foil equipment.

It is reported that foil production increases product value approximately 100 pct on the average and that at maximum capacity the gross sales volume of the foil division would approximate $5 million per year.

This foil mill is the sixth aluminum plant operation of the Permanente Metals Corp. The others are: alumina plant at Baton Rouge, La.; aluminum reduction plants at Tacoma and Mead, Wash.; sheet rolling mills at Trentwood, Wash.; and a rod, bar and cable mill at Newark, Ohio. The company has been in the aluminum business since July 1946.

•

Oil Tool Manufacturers Curtailing Production

Los Angeles

• • • **With oil exploration** slowing down and showing few signs of picking up during this year at any rate, oil tool manufacturers here have been cutting production and laying off men. Subsequently, they have been reducing orders for forgings and castings.

Many reasons are reported for the drop in the oil business and some vary with the region. Generally, supply has caught up with demand.

In the fields in Utah, Wyoming and other places in the Rockies, too much low gravity crude is being produced and this is not good for conversion into gasoline. Crude is in abundance.

In west Texas, a new problem has slowed down activities. Here a state commission has ordered gas conserved and pipe lines are not available to do the job at present.

Los Angeles and Houston long have been the two largest centers of oil tool manufacturing with foundries nearby supplying much of the material needed. Both areas hope for some relief through a possible increase in export trade.

As in most export trade, however, the dollar problem holds them back. Argentina, which has considerable natural resources, is spending most of its scarce dollars to import fuel and is not able to hold back enough to import oil tools and develop fields.

In Alberta, Canada, where probably the biggest reserve in the country lies, most of the work is in the form of wildcatting to discover the edges of a giant field. Oil there is above normal in quality, but the problem is one of transportation and distribution.

Legislation and court rulings concerning ownership of tidelands oil deposits also are listed by oilmen as possible contributing factors to the slow down.

Typical of the cutbacks is that of one of the oil tool manufacturers in the Los Angeles area, which normally purchases about 1200 tons of steel castings each year. This company has been forced to lay off 32 pct of its employes. This brings the employment list back to the approximate 1939 level.

•

Builds Welded Steel Boats

Seattle

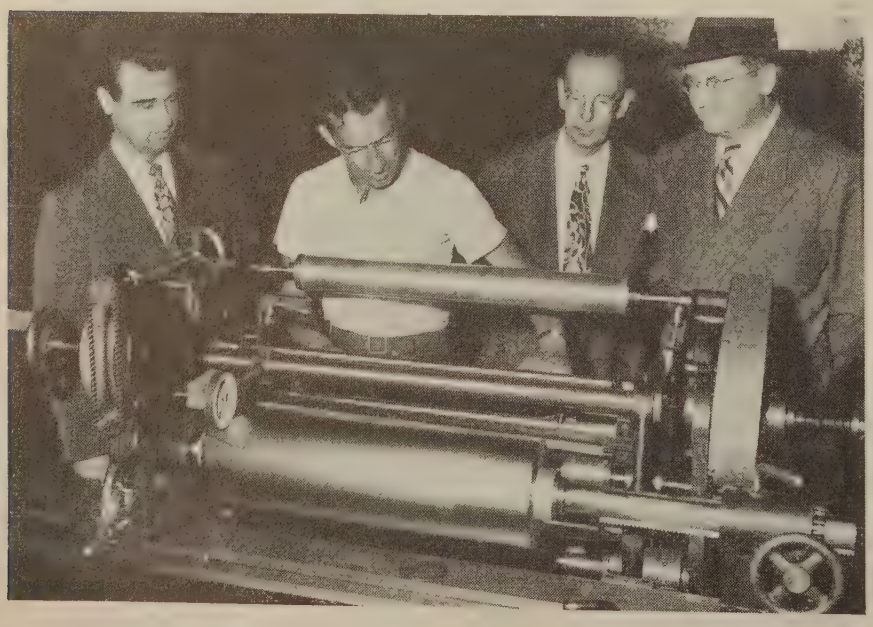
• • • **Long Marine** Construction Co. on Seattle's West Waterway has taken a prominent part in the city's small-boat industry since it was established 3½ years ago to build welded steel boats with wooden cabins and diesel engines for the commercial field.

Established by Robert W. Long, the firm is now constructing its eighth boat which is a 36-footer of the Alaska-seiner type for the Washington Fish & Oyster Co.

Other boats delivered this spring include the 71-ft cannery tender Jaguar and the 58-ft purse seiner Flamingo.

The steel plate on the boats varies in thickness from 5/16-in. for the 71-footer to 3/16-in. for the 36-ft boat. The concern uses an angle iron and web-frame construction for the ribbing.

NO FOILING AROUND: *F. J. Drewes, plant manager; E. G. Popple, plant superintendent; and T. J. Ready, assistant general manager of the Permanente Metals Products Corp., Aluminum Division; confer on operations of a slitter at the newly opened aluminum foil plant of the company at Permanente, Calif. Present production is approximately* 100,000 *lbs per month and the plant capacity is between* 500,000 *and* 700,000 *tons per month.*



Swinging the Big Sticks with

VICKERS Hydraulic POWER STEERING

GERLINGER MATERIAL CARRIER

Another Cost-Cutting Application of VICKERS HYDRAULICS

VICKERS
HYDRAULIC POWER STEERING
is Effortless, Positive, Shockless
Vickers Hydraulic Steering Booster with Integral Overload Relief Valve. Bulletin 47-30a.
Vickers Balanced Vane Type Pump is Engine Driven. Bulletins 36-12 and 47-32.

Vickers Hydraulic Power Steering makes it easier and cheaper to handle logs and large piles of lumber with the Gerlinger Material Carrier. Four Wheel Steering is effortless in spite of very heavy front wheel loading. The quick, easy maneuverability speeds operation . . . substantially lowers materials handling costs.

Not only is Vickers Hydraulic Power Steering effortless and safe, it also avoids load on the conventional steering gear. Steering force reaction is absorbed by the vehicle frame . . . road shock does not reach the steering gear.

Vickers Hydraulic Power Steering is saving money for the users of carriers, trucks, road machinery and other mobile equipment . . . not only by speeding operation, but also by reducing driver fatigue. For detailed information, ask for Bulletin 47-30a.

VICKERS Incorporated

DIVISION OF THE SPERRY CORPORATION

1420 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices:

ATLANTA • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • LOS ANGELES • NEWARK • PHILADELPHIA • PITTSBURGH • ROCHESTER ROCKFORD • ST. LOUIS • SEATTLE • TULSA • WASHINGTON • WORCESTER

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

PERSONALS

CARL L. HUFF, president and director, Bliss & Laughlin, Inc.

• **Carl L. Huff,** formerly vice-president in charge of sales, has been elected president and a director of Bliss & Laughlin, Inc., Harvey, Ill. **George A. Spaulding** has been made vice-president in charge of eastern operations. **H. W. Lillengren,** formerly secretary and treasurer, has been appointed vice-president and treasurer. **E. F. Thomason** has been appointed secretary.

• **C. Hix Jones** has been appointed district sales manager of the Detroit district of Youngstown Sheet & Tube Co., replacing **R. J. Mullally,** who has retired after 29 years of service with the company.

• **John F. Spangler** has been appointed sales representative in the Illinois-Iowa territory of Continental Steel Corp., Kokomo, Ind., succeeding **Jack J. Barrett,** who has been transferred to Indianapolis as sales representative for southern and central Indiana. Mr. Barrett has his headquarters in the Indianapolis office of Continental Steel. He succeeds **J. W. Hurt, Jr.,** who has resigned from the company.

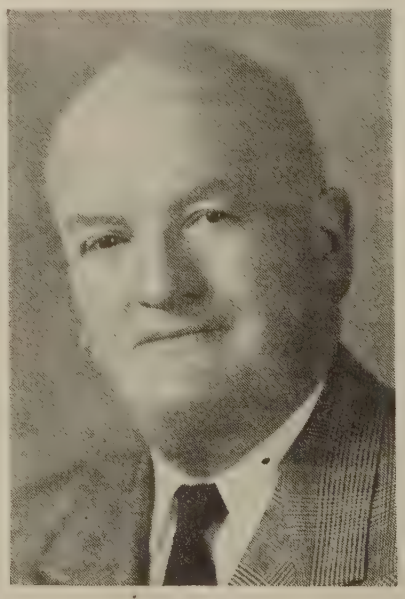
• **John A. Lauck** has been named vice-president of Pesco Products division of the Borg-Warner Corp., Chicago. He has been with the company 12 years. **D. A. Sutherland** has been appointed industrial relations director. **G. V. Patrick** has joined the company as eastern sales manager and **Frank R. Canney** has been appointed sales engineer.

o o o

• **R. G. Caulley** has been appointed general sales manager of Peninsular Grinding Wheel Co., Detroit. Formerly assistant sales manager for Republic Steel Corp. and director of purchases at Fruehauf Trailer Co., Mr. Caulley operated his own wholesale steel warehouse in Florida before joining Peninsular. **W. R. Morgan,** formerly research professor of ceramic engineering at the University of Illinois, has been appointed director of production and engineering of the new vitrified division plant of Peninsular Grinding Wheel. Dr. Morgan had also been director of research at Bay State Abrasive Products, and associate professor of ceramic engineering at Rutgers University.

• **Robert Ervin, Max Unseld** and **A. Reed Schuster** have been added to the staff of Lukens Steel Co., Coatesville, Pa. These three experienced paper machinery men have joined the development engineering personnel of the company. Mr. Ervin had formerly been connected with Union Bag & Paper Corp., Savannah. Mr. Unseld had been a design engineer with Bagley & Sewall, Watertown, N. Y., and Mr. Schuster had been an erection supervisor with Bagley & Sewall.

PERRY L. FRANCIS, vice-president in charge of sales, Alan Wood Steel Co., whose appointment was announced recently in THE IRON AGE.



H. L. SMALLEY, assistant to the president, Harbison-Walker Refractories Co.

• **H. L. Smalley,** formerly assistant to the vice-president with general supervision over the Chicago, Detroit and Indianapolis districts, has been appointed assistant to the president of Harbison-Walker Refractories Co., Pittsburgh, with his headquarters in that city. Mr. Smalley has been with the company since 1922.

• **E. D. Bransome,** who for the last five years has been president of Vanadium Corp, of America, has been appointed chairman of the board and president of Mack Trucks, Inc., New York. Mr. Bransome succeeds **L. G. Bissell,** as chairman of the board and **C. T. Ruhf,** as president of the company. Mr. Bransome continues his association with the Vanadium Corp. as chairman of the board and a member of the executive committee and Messrs. Bissell and Ruhf continue as members of the Mack board, with Mr. Ruhf remaining with the company in a consulting capacity.

• **John A. Carter** has been elected president of Oakite Products, Inc., New York, succeeding **D. C. Ball,** who has been elected chairman of the board. **David S. Ball,** former vice-president, has been elected to the newly-created office of first vice-president. Mr. Carter has been associated with Oakite 34 years, serving in recent years as assistant to the president and since 1947 as general manager of the company.

"In direct labor alone Udylite equipment has more than paid for itself"

...reports Factory Manager

FRIDEN Calculating Machine Co., Inc.

SAN LEANDRO, CALIFORNIA

February 24, 1949

Udylite Corporation
Detroit 11, Michigan

Gentlemen:

We have had our Udylite automatic plating machine in operation for approximately two years, and its performance has been so outstandingly satisfactory that we feel we should compliment you on this machine. It has exceeded our fondest expectations in every respect,

The following is a list of its performance characteristics that I feel more than vindicate our judgment in its purchase.

1. Quality - The quality of the plating has been excellent as proved by the elimination of rejects due to faulty plating and by the fine appearance of the work. The addition of the bright dipping step has made for a very bright and clean appearance of the parts and has elicited comments from a number of sources.

2. Labor Saving - The machine has proven a great labor saver, From the standpoint of direct labor alone, it has more than paid for itself.

3. Uniformity - The uniformity of finish, both as to thickness and appearance, is remarkable, and the ability to hold plated parts to extremely close tolerances has been a great help in assuring the satisfactory performance of our calculator machines.

4. Maintenance - We have had no major breakdowns whatsoever and practically no maintenance problems have appeared to date. All the working parts are readily accessible, and peridcic inspection has shown that the machine properly serviced and lubricated should have an extremely long life.

5. Inspection - The high quality and fine uniformity of plating has cut down our inspection costs to a minimum.

6. Blind holes - In our product we have a number of blind holes which formerly gave us trouble due to rusting. This has been eliminated by the Udylite method of drying parts.

The above facts may seem extremely complimentary and, frankly, they are intended to be, for the Udylite fully-automatic plating machine is one of our proudest possessions and one which has certainly paid off in quality, productivity, and dollars' and cents' savings.

Very truly yours,

FRIDEN CALCULATING MACHINE CO., INC.

Dunstan S. Gross

Dunstan S. Gross
Factory Manager

DSG:ea

D. S. Gross, Factory Manager, explains plating operations to Friden Detroit Representatives P. E. Strom and P. Pattyn.

YOU TOO can get results like these...WRITE TODAY

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

PIONEER OF A BETTER WAY IN PLATING

W. J. LONG (left), and WILLIAM G. STEWART (right), vice-presidents, Universal-Cyclops Steel Corp.

• **W. J. Long** and **William G. Stewart** have been elected vice-presidents of Universal Cyclops Steel Corp., Bridgeville, Pa. Mr. Long, who has been with the company approximately 20 years, has been manager of tool steel sales since 1945. Mr. Stewart, who has also been with the company about 20 years, has been assistant secretary since 1942.

• **Harold E. Strang** has been appointed manager of the apparatus department's meter and instrument divisions, General Electric Company, Lynn, Mass., succeeding Nicholas M. DuChemin who has recently been appointed assistant general manager of the department. Mr. Strang had formerly been engineering manager of G.E.'s affiliated manufacturing companies department. He has been with the company since 1922. **H. O. Trumpfheller,** formerly assistant to the manager of manufacturing, has been appointed manager of manufacturing; **David Blair,** formerly production manager, has been made assistant to the manager in charge of procedures; **C. E. Shank,** formerly assistant production manager, has been appointed production manager, all in the locomotive and car equipment divisions of the apparatus department. Mr. Trumpfheller has been with G.E. since 1914 and had been serving as assistant to the manager in charge of manufacturing of the two divisions. Mr. Blair has been with the company since 1916 and had most recently been production manager of the divisions. Mr. Shank, who succeeds Mr. Blair as production manager, has been with G.E. since 1926, and has served as assistant production manager at the Erie Works since 1944.

• **W. R. Reinhold** has been appointed manager of refrigeration sales for Cutler-Hammer, Inc., succeeding **R. M. Van Vleet,** who retired recently after 45 years of service with the company. Mr. Reinhold has been with Cutler-Hammer since 1933. He was appointed manager of refrigeration sales in 1944.

• **George M. Baumann** has been appointed purchasing agent and assistant to the plant manager, Federated Metals division, American Smelting & Refining Co., with his headquarters in Whiting, Ind. Mr. Baumann joined Federated in 1936 and for the past three years has been assistant to the general manager of scrap purchases at the company's headquarters in New York.

• **Peter Storti** has been named rotary oil burner development engineer for Iron Fireman Mfg. Co., Portland, Ore. Mr. Storti had formerly been general manager, combustion equipment division, Dalmo Victor Co., San Carlos, Calif.

• **Elmer W. Krueger** has been appointed operations manager of the Cleveland Pneumatic Tool Co., Cleveland. Mr. Krueger had formerly served as manager of sales administration and is succeeded in that position by **John M. Chapman.** Mr. Krueger has been with the company since 1922 and Mr. Chapman joined Cleveland Pneumatic early this year, having previously served Fairchild Aircraft Co. as purchasing agent.

• **Burton Durkee** has been appointed director of advertising for Kaiser-Frazer Corp., Willow Run, Mich. Mr. Durkee succeeds **H. M. Swartwood,** who has retired for reasons of health. Mr. Durkee had formerly been account executive and vice-president of Morris F. Swaney advertising agency. Mr. Swartwood continues with Kaiser-Frazer in an advisory capacity. **Robert A. Graney** has been appointed assistant to the president in charge of industrial relations. He had previously been associated with the Consolidated Edison Co. of New York and has also served as a White House secret service agent. Mr. Graney joined Henry J. Kaiser in 1943. At the time of his new appointment, he had been assistant to the vice-president in charge of operations at the Kaiser steel mills in Fontana, Calif. **J. O. Murray,** formerly director of industrial relations, has been transferred to the West Coast on special assignment.

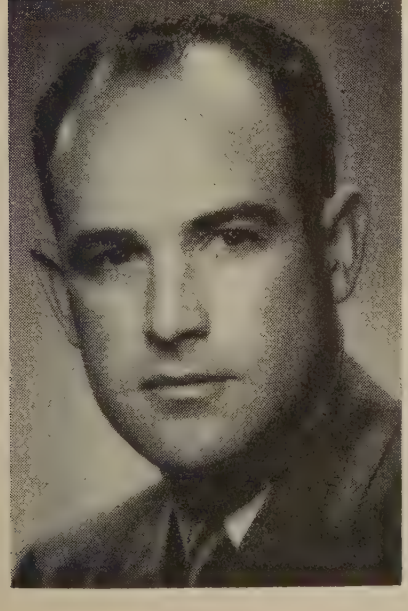
HOMER A. SIMPSON, vice-president, Daystrom Corp., whose appointment was announced in the June 16 issue of THE IRON AGE, P. 120.

• **Charles Pingry** has been named district sales engineer at the Dallas office of Chain Belt Co. of Milwaukee.

• **Arthur K. Watson,** has been elected vice-president and a director of International Business Machines Co. of Delaware, New York. Mr. Watson has been assistant to the manager of the World Trade division, IBM Corp. since late last year. **George H. Sheppard,** president of International Business Machines Co., Ltd. of Canada and **James H. Johnston,** general manager of IBM World Manufacturing, were also elected directors of IBM of Delaware. **Thomas H. Connell** has been appointed assistant sales manager of the International Time Recording division of IBM, with headquarters in New York. He had previously been ITR manager in the Detroit office. Mr. Connell joined IBM in 1932 and served as special representative until his appointment in 1940 to the position from which he has just been promoted.

• **Robert C. Friedly** has been named central states regional manager for Nelson Stud Welding division, Morton Gregory Corp., Lorain, Ohio., with headquarters in the company's Chicago office. Mr. Friedly joined Nelson Stud Welding in 1946 as a construction industry specialist and has served as assistant general sales manager since 1948.

ROBERT C. FRIEDLY, regional manager, Nelson Stud Welding Div., Morton Gregory Corp.



PHILIP K. POULTON, secretary-treasurer, Follansbee Steel Corp., whose appointment was announced in the June 16 issue of THE IRON AGE, P. 120.

• **John S. Michie** has been appointed works manager of Reeves Pulley Co., Columbus, Ind., succeeding **H. E. Brooks,** who retired recently after 29 years with the company.

• **Raymond T. Lyons** has been appointed operating manager of the southwestern district warehouse of the construction materials department of General Electric Co., Bridgeport, Conn., with his headquarters at Houston. He has been with G.E. since 1939. **William L. Immer** has been named a wire and cable specialist for the central district of the department, located in St. Louis. Mr. Immer joined G.E. in 1927. Since 1948 he has been manager of sales service for the welding equipment division in Schenectady. **Don C. McKinley,** formerly in charge of air conditioning and refrigerator sales in the New York district, has been appointed wire and cable specialist for the southeastern district of the construction materials department, with his headquarters in Atlanta. Mr. McKinley has been with G.E. since 1930. **James D. Brown Jr.** and **Clarence W. Ford** have been appointed building project specialists. Mr. Brown, who has been with the company since 1946, has been assigned to the southwestern district with headquarters in Houston and Mr. Ford, who has been with the company 14 years, has been assigned to the Pacific district at Los Angeles.

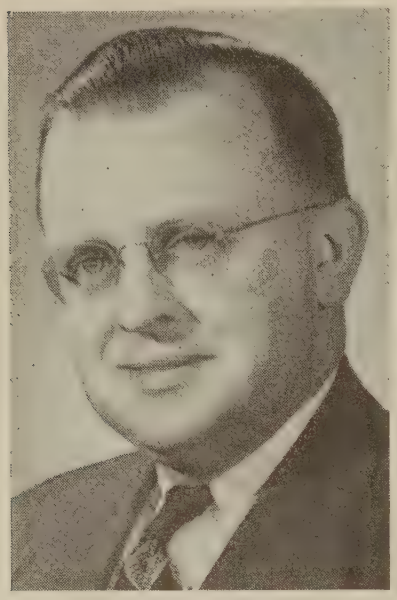
HOWARD M. DAWSON, mid-eastern district sales manager, Firth Sterling Steel & Carbide Corp.

• **Howard M. Dawson** has been appointed sales manager of the mid-eastern district New York and Philadelphia offices, Firth Sterling Steel & Carbide Corp., McKeesport, Pa., succeeding **A. E. Barker** who has recently been promoted to assistant to the president. Mr. Dawson had formerly been president, Jessop Steel International Co. He is a member of the steel advisory committee of the Dept. of Commerce and vice-president and director of the Export Managers Assn. of New York.

• **Frank R. Denton** has been elected a director of Scaife Co., Oakmont, Pa., to fill the vacancy caused by the death of **James M. Magee.**

• **W. F. Jennings** has been elected president and treasurer, Bound Brook Oil-Less Bearing Co., Bound Brook, N. J. **H. O. Johnson** has been made executive vice-president and secretary; **George O. Smalley,** vice-president; **W. R. Toeplitz,** vice-president in charge of engineering research; **William T. Allen,** assistant secretary and **G. R. Brokaw,** assistant treasurer.

• **Robert Lagas** has been appointed purchasing agent for Stacey-Dresser Engineering Div., Stacey Bros. Gas Construction Co., Cleveland. Mr. Lagas joined the company as chief inspector and has been assistant purchasing agent for the past year.



M. J. WURZBACH of the public relations staff of American Steel & Wire Co.

• **M. J. Wurzbach,** former Cleveland newspaperman, has joined the public relations staff of American Steel & Wire Co., Cleveland. Mr. Wurzbach had previously been director of customer and public relations for American Greeting Publishers, Inc., since 1946 and for 10 years prior to that time had been a member of the staff of the Cleveland Press.

• **James P. Magee** has been promoted to plant superintendent, Electromode Corp., Rochester, succeeding **Harry J. Dixon,** who resigned. Mr. Magee had been supervisor of production control.

• **Ray H. Anderson** has been appointed sales manger of the Sisalkraft Co., Chicago, New York and San Francisco, succeeding W. L. Kennedy, who died. Mr. Anderson has been associated with the sales department of the company since 1939.

• **F. J. Healy** has been appointed president of the newly-formed Sylvania Electric (Canada) Ltd., with a plant at Drummondville in the Province of Quebec. **R. H. Bishop** has been named vice-president; **William O'Keefe,** secretary; **M. F. Balcom,** treasurer. Mr. O'Keefe, who has been general foreman at the Danvers, Mass., plant of Sylvania, manages the Canadian plant, and **J. C. Hicks,** formerly Kansas City division manager, has been named sales manager, with offices in Montreal.

• **Henry A. Blessing,** formerly Chicago field engineer, has been appointed abrasive engineer, Norton Co., Worcester, with headquarters in Des Moines, Iowa. **Myles A. Snyder** of the Worcester sales engineering department, has been named Chicago field engineer. **David H. Paul,** also of the Worcester Sales engineering department, has been named abrasive engineer in charge of a new territory with headquarters in Memphis, Tenn. These changes are effective July 1.

• **Raymond Z. Oswald,** formerly vice-president in charge of sales, has been elected president, Monmouth Products Co., Cleveland, succeeding Ernest L. Davis, who died. Mr. Oswald joined the company three years ago as assistant to the president, subsequently serving as sales manager and vice-president in charge of sales.

• **Harold W. Land** has joined H. D. Smith Mfg. Co., East Detroit, Mich., as master mechanic. Mr. Land had formerly been assistant master mechanic at Ainsworth Mfg. Corp.

• **H. G. Wild** has been appointed eastern zone manager for Porter-Cable Machine Co., Syracuse. Mr. Wild had formerly served as central New York district sales representative.

• **Robert Montgomery** has been appointed assistant to the first vice-president of Willys-Overland Motors, Inc., Toledo. Mr. Montgomery, for the past two years has served as comptroller of Willys-Overland and has been with Willys since 1946.

• **Harry R. Reynolds,** formerly chief engineer, has been appointed consulting engineer and **Howell L. Potter** has been named chief engineer, Fafnir Bearing Co., New Britain, Conn. Mr. Reynolds is a pioneer in the American ball bearing industry, having been with Fafnir since 1911. Mr. Potter has been with the company 15 years, serving as assistant chief engineer in recent years.

• **David E. Linn** has been appointed sales manager of Diamond Steel Co., Inc., Chicago, replacing **Robert Addison** who has resigned.

(CONTINUED ON PAGE 136)

OBITUARY...

• **Charles M. Harrison,** 79, president-treasurer, Gerry & Northrup Co., Boston, died June 3.

• **Charles E. Fontaine,** 52, vice-president, Lone Star Cement Corp., Birmingham, died June 9.

• **George A. Baker,** construction engineer, Milton, Mass., died June 4.

• **Milton F. Spiegel,** 55, dealer in metal and scrap iron, W. M. Spiegel Sons, Elmira, N. Y., died recently.

• **J. Harvey Lang,** 80, an authority on the marketing of tin, formerly associated with United Lead Co. and American Metal Co., and who retired in 1936, died in New Rochelle, N. Y., June 11.

• **Robert R. M. Carpenter,** 71, a director and former vice-president, E. I. duPont deNemours & Co., Inc., Wilmington, Del., died June 11.

• **Walter L. Thompson, Jr.,** assistant sales manager, Pittsburgh district, Jones & Laughlin Steel Corp., Pittsburgh, died June 8.

• **Earl C. Souder,** for 20 years an industrial sales engineer in the steel mill section at the East Pittsburgh plant of Westinghouse Electric Corp., died June 8.

• **Edward R. Young,** 56, district manager of Climax Molybdenum Co. of New York, died June 9.

• **Raymond T. Reese,** 75, formerly general auditor, American Smelting & Refining Co., and treasurer, Copper Recovery Corp., retired, died June 13.

• **Forester L. Kennedy,** 57, general sales manager, eastern area, Great Lakes Steel Corp., New York, died June 9.

• **John Ballantyne,** 49, chairman of the board and former president, Philco Corp., Philadelphia, died June 10.

IMPORTANT ANNOUNCEMENT

ON ENCLOSED GEAR DRIVES

Regardless of what your requirements in enclosed gear drives may be, the Foote Bros. line includes drives exactly suited to any application.

Foote Bros.' manufacturing experience goes back nearly a century, and Foote Bros.' large plants include the newest in equipment for the production of highest quality gearing. Check with the Foote Bros. representative near you for drives suited to your needs.

FOOTE BROS. HYPOWER ENCLOSED GEAR DRIVES

A complete line of worm gear drives that assures economy in original cost and in operation. They are extremely compact in design and possess greatly increased thermal capacity. Available in both horizontal and vertical types.

FOOTE BROS. HYGRADE ENCLOSED GEAR DRIVES

This complete line of enclosed worm gear drives has been newly engineered and offers the maximum in rugged dependability. Available in a wide range of ratios in both horizontal and vertical types.

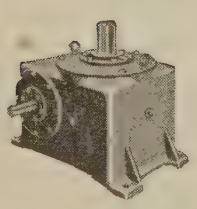
FOOTE BROS. MAXI-POWER ENCLOSED GEAR DRIVES

Helical gear drives available in single, double and triple reductions in sizes and ratios to meet practically any requirement for a high quality helical gear unit. This newly engineered line of enclosed gear drives represents the last word in power transmission equipment.

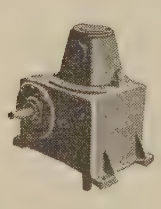
FOOTE BROS. STRAIGHT LINE DRIVES

This new line of compact drives will shortly be introduced. Small in size, light in weight—they will meet many industrial applications.

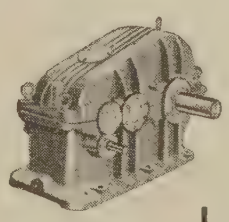
Hypower Horizontal



Hygrade Vertical



Hygrade Top Hat



Maxi-Power Helical

Straight-Line

Agitator Drive

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. M, 4545 S. Western Blvd. Chicago 9, Illinois

Check the Drives you are interested in

FOOTE BROS. GEAR & MACHINE CORPORATION
Dept. M, 4545 South Western Blvd., Chicago 9, Illinois

☐ Hygrade ☐ Maxi-Power
☐ Hypower ☐ Straight Line

Name.....

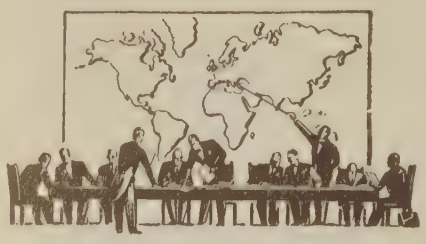
Company.....

Address.....

City.....*State*.....

European Letter . . .

• French economy no longer at mercy of domestic or international emergencies . . . Fourth report of Monnet Plan details interesting achievements . . . Marshall aid, realization of overseas holdings, good harvest, are credited.



LONDON—A clear and comprehensive account of French achievements in the two years during which the Monnet Plan has been in force is given by a recent survey published in Paris. It is the work of the *Commissariat Général du Plan de Modernization et d'Equipment,* of which M. Monnet is the chief. The periodic reports of the Commissariat—this is the fourth since the Plan was initiated in 1947—are of special interest because they review the economic state of the nation as a whole, as well as the progress made with concrete aspects of the Plan itself.

The original, broad objectives of the Monnet Plan were to make the French nation solvent and to raise its standard of living. These goals were to be reached through the systematic reequipment and expansion of French industry, badly neglected during the interwar years and partially destroyed by the war. The dilemma before the planners was how to carry out a great investment plan that would repair the neglect of a generation and at the same time raise the people's standard of consumption. The magnitude of this challenge can be appreciated when it is recalled that in 1946 industrial production in France was 20 pct below the 1938 level and consumption was 15 pct down.

The task was complicated by the fact that the Plan was attempting to grapple with an economy more free than controlled. Of the six industries singled out for special efforts—coal, electricity, transport, steel, cement and agricultural machinery—only the first three are nationalized. It was the hope of the planners that it, with the help and guidance of the government, both production and output per man could be raised in these six key industries, then France would be well on the way to prosperity.

Today, the report finds, France has covered the first lap of the struggle in attaining what the authors describe as a state of demi-prosperity. During 1948 French production caught up with and surpassed the level of the depressed years immediately before the war, and by March of this year it had risen above the 1929 peak. Today, the report comments, the French economy is no longer completely at the mercy of domestic or international emergencies. The days when it trembled continuously on the edge of a precipice are over. France now has reserves.

According to the report, the factors chiefly responsible for this achievement are Marshall aid (for which the Plan did not originally bargain), the realizing of overseas holdings, an exceptionally good harvest last year, and steady progress in reequipment. Of the six industries where the planners concentrated the bulk of their economic and intellectual resources, the best results were achieved in transport and agricultural machinery. As the following table shows, the French railways moved a greater tonnage in 1948 than in 1938. Some measure of the success in the modernization of agriculture is shown by the fact that last year 12,400 tractors were produced as compared with 4200 in 1947 and a negligible number before the war. Even in these two favored fields, however, much remains to be done. The 1948 output of tractors was a mere 25 pct of the target aimed at three years hence in 1952-53, while the tonnage moved by the railway system last year was only 70 pct of that handled in the peak year of 1929.

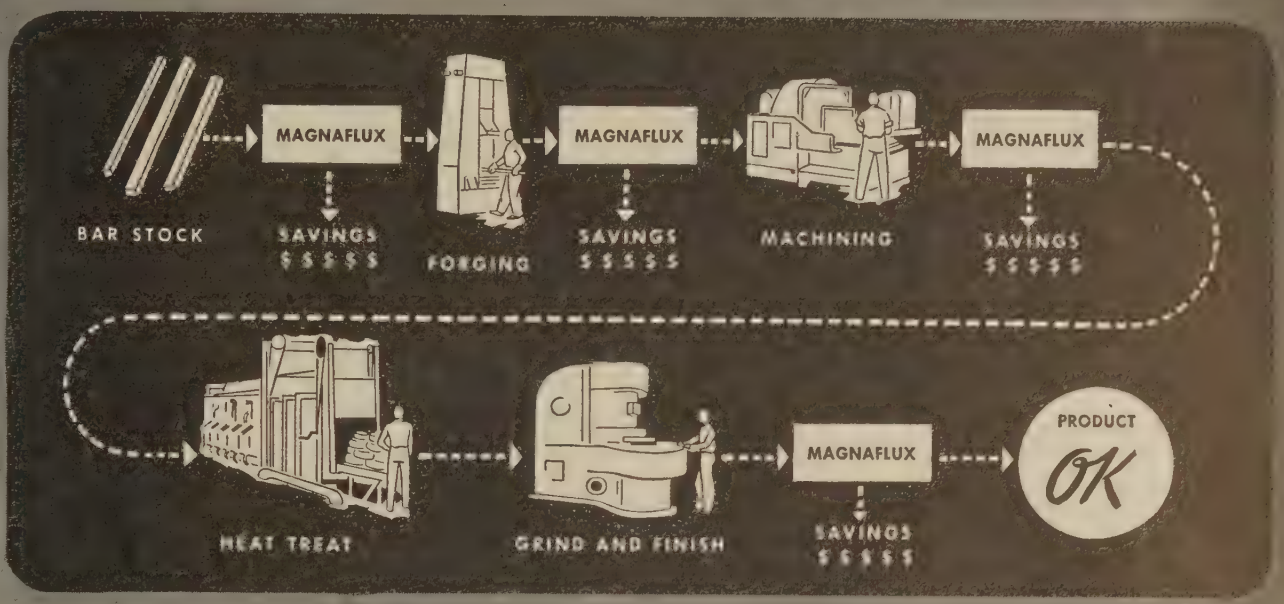
Reprinted from the London Economist by special permission.—Ed.

COAL production has fallen badly short of the mark set for it, largely because of strikes. In fact, the annual rate of French coal production has steadily declined ever since the Liberation, although in the first and strike-free half of 1948 total production was running only 15 pct below the target for 1952-53. Fortunately for French industry, coal production in the Saar, incorporated last spring, has considerably expanded; in the second half of 1948 output there was almost back to the 1929 level. The generation of electric power in 1948 showed a 10 pct advance over 1947 but restrictions still had to be maintained on consumption. Unless production is expanded at a faster rate, output at the end of the next three years will be short of the target. Last year crude steel production was 18 pct up on 1938 but was 25 pct below the 1929 peak. The planners, however, have set their sights much higher than anything accomplished by the French steel industry during the interwar years. They aim at an annual output of 12.5 million tons; the 1948 rate was only 58 pct of this goal.

Cement production has risen sharply by 40 pct over the past year as compared with 1947 and in the best weeks almost touched the 1929 rate. But here again the planners are striving to better the record of the best of the prewar years, and cement production will have to increase by over 50 pct if it is to reach the 1952-53 target. Perhaps the most disturbing feature revealed in this table is that, with the exception of agricultural machinery and refined oil, French output in the second half of last year showed hardly any improvement over the first half. In some indus-

(CONTINUED ON PAGE 132)

How MAGNAFLUX* Production Line Inspection CAN CUT YOUR MANUFACTURING COSTS



Defective parts are rejected *before* additional money is spent in finishing them with inspection by Magnaflux on the production line and trouble is found and corrected when it occurs—not later. For many plants this method of inspection is already saving thousands of dollars in manufacturing costs each year.

For example, by inspection with Magnaflux a gear manufacturer is able to reject defective pieces of material in bar form, or after forging. He saves the cost of machining, heat treating, grinding and finishing many pieces which would later be rejected at final inspection. In rejecting still more pieces after machining, with a third Magnaflux inspection, he saves the cost of heat treating and grinding.

Add up the total savings made by cutting out subsequent steps for all rejects. You'll see that *total* cost of inspection is *much less* than cost of carrying all defective parts to finish stage. Here is a table showing these savings:

Table Based on Processing 1000 Parts	Processing Cost Investment	Rejects Due to Operation	Savings in Cost to Finish	Inspection Costs all Parts
Bar	$ 1.00	10	$190.00	$ 70.00
Forging	3.00	10	170.00	69.30
Machined Gear	11.00	10	90.00	68.60
Ground and Finished Gear	20.00	20		67.20
		50	$450.00	$275.10

Inspection with Magnaflux not only pays for itself, but gives a net savings of $174.90 per 1,000 gears. This example is based on 100% inspection after each operation except heat treating. However, sampling methods often can be used for similar in-process inspection to cut manufacturing costs.

Magnaflux, and other Magnaflux Corporation non-destructive testing methods, make cracks and other defects readily visible for inspection of every part at production line speed. Write today for full information on how Magnaflux can help you raise product quality and cut production costs.

*Magnaflux, Reg. U. S. Pat. Off., a trade mark of Magnaflux Corporation applied to its equipment and materials for magnetic particle inspection.

MAGNAFLUX CORPORATION

Reg. U.S. Pat. Office

M A G N A F L U X C O R P O R A T I O N

5902 Northwest Highway, Chicago 31, Illinois

NEW YORK DETROIT DALLAS LOS ANGELES CLEVELAND

• **CUT BACKS**—At Buffalo, Bethlehem Steel Corp. took off three openhearths. This leaves 25 of the company's 28 furnaces operating there. Work will be staggered so that no layoffs will result. Republic took off two of its eight active openhearths and reduced basic iron production 25 pct by slowing down its two blast furnaces. Hanna Furnace Corp. is scheduled to take off one of four blast furnaces for relining on June 25. Donner-Hanna Coke Corp., owned jointly by Republic and Hanna, cut coke output from 3200 to 2800 tons daily. Tonawanda Iron Corp. blast furnace is now nearing completion of relining which started May 1.

• **TIN CONTROLS VOTED**—Government controls over the use of tin are to be extended for one year. The Senate is getting ready to act on a bill to extend this authority until June 30, 1950. Similar legislation was passed by the House early this week. Representative Spence, D., Ky., told the lower chamber that although U. S. industries will use about 119,000 long tons of tin in 1949, the supply is still short of stockpiling and industrial demands.

• **WAREHOUSE LAYOFFS**—F.o.b. mill pricing has taken some Eastern warehouses out of the competitive price range to such an extent that they have been forced to lay off some sales and administrative personnel. This situation developed since April when warehouse order volume dropped sharply and customers could get all required steel from the lowest priced jobber.

• **FIRST J & L CUTBACK**—Jones & Laughlin Steel Corp., feeling the first effects of declining demand, cut back some Pittsburgh district melting operations late last week. The half dozen antique 62-ton openhearths at South Works were taken off for an indefinite period. Besides two blast furnaces now off for repairs, a third was blown out for lack of orders.

• **HOMES GOING UP**—With 95,000 new dwelling units started during May, the 5-month total for 1949 reached 343,300 as against 379,800 last year. While actual starts lag behind 1948, contrary to last year the upward trend of permit issuance has continued over into June.

• **PRICE REDUCTIONS**—Sheffield Steel Co. announced new prices on all their products, effective June 15. Price cuts were made to meet competition from other steel producing areas.

• **STUDY DIP**—Two subcommittees of Sen. O'Mahoney's Joint Congressional Economic Committee will start at once collecting facts on the current business dip. After preliminary work is completed first hearings on the subject will probably get underway next month. It is expected discussions will include various business leaders, including steel, government economists, college professors, etc. Answers to two big questions will be sought: (1) What can the government do to halt unemployment trends? (2) How can it promote investment of private capital in Industry?

• **NEW OVENS**—Republic Steel Corp. has awarded Koppers Co., Inc., a contract for construction of a new battery of byproduct coke ovens and material handling facilities at its Youngstown plant. The 65-oven battery is expected to be in operation by the middle of 1950. It will be able to carbonize 1505 tons of coal per day. Ovens will be underfired with coke oven gas.

• **KAISER COAL**—Extensive drilling tests have proved a potential new source of more than 30 million tons of high-grade coking coal in the rich mining areas of central Utah, according to Kaiser Co., Inc. Studies of facilities have already begun. When operating the new mines are expected to supply coking coal for expansion of the Kaiser steel plant at Fontana, Calif.

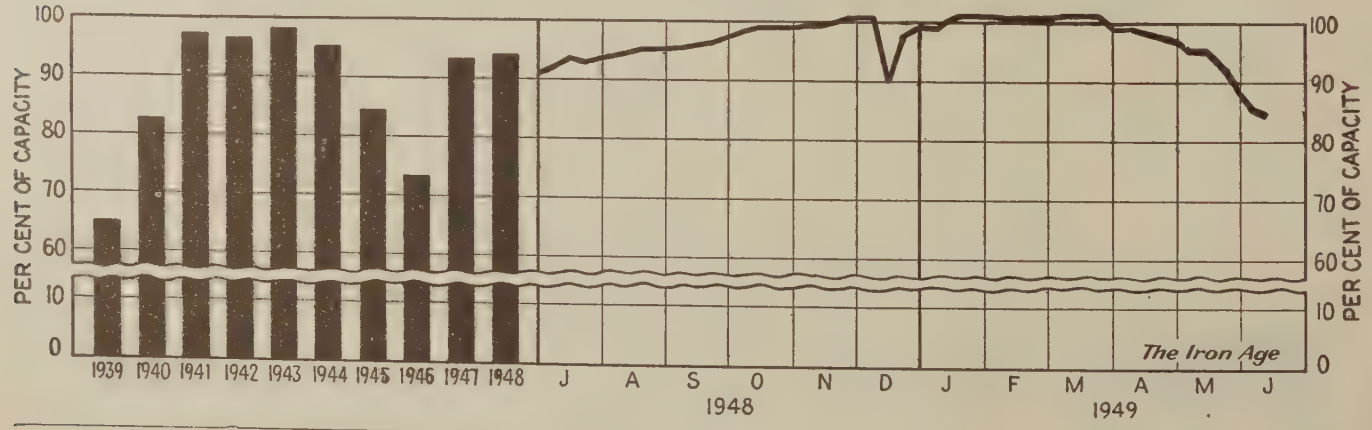
• **HEALTHY CUTS**—Carboloy Co., Inc., has announced reductions averaging 20 pct and ranging up to 30 pct on its line of standard round hole dies for wire, bar and tube drawing. Lower prices are effective immediately. The company had previously cut prices on its standard single point tools.

• **WEIR WRITES**—In a letter dated June 1, received last week by National Steel stockholders, chairman E. T. Weir said he saw no cause for alarm despite his prediction that steel industry operations would go down to the 85 pct level by July 1 (now verified) and decline further in the second half of the year. We always go from unwarranted optimism to unwarranted pessimism, he declared.

• **BRASS SHIPMENTS**—Combined volume of shipments of ingot brass and bronze for May is 11,114 tons compared with 10,695 tons in April. Shipments for May a year ago totaled 23,716 tons.

• **GALVANIZED SHEETS**—On June 16 Carnegie-Illinois Steel Corp. reduced the price of galvanized sheets $1.50 a ton following a drop in the price of zinc.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
June 14	83.5*	97.0	76.5*	88.0	90.0*	92.0*	80.5	103.0	100.5*	88.5	75.0	66.5	85.0	86.5
June 21	84.0	96.0	76.5	88.0	93.5	90.0	78.0	103.0	93.0	84.5	74.5	66.5	89.0	84.5

* Revised.

Industrial News Summary

- **Steel Backlogs Going Fast**
- **Inventories Being Cut Down**
- **Scrap Market Sags 67¢ A Ton**

BY the end of this month steel company order backlogs will have disappeared for all practical purposes. Business is generally on a current, or hand-to-mouth basis in all but a very few steel products. The only orders on the books in most products are those that must be there for production planning. Those steel people who long ago discounted the size of their backlogs are not surprised; they knew that cancellations could wipe them out—and they have done so. But the statisticians who used backlogs as a measure of future steel business are surprised.

Backlogs still exist in some products: Plate, oil and gas line pipe, rails and structural shapes. Most of these products are involved in long-range planning and are capital, rather than out-of-pocket, expenses. On the latter type products, which depend almost entirely on consumer goods sales, caution still prevails. Except for tinplate which has already been made on customer orders and is being stocked at the mills, there is no evidence of buyer concern about possible interruption of steel shipments due to labor trouble.

This lack of concern about future deliveries stems from relatively high raw material inventories and from the fact that a lot of steel users will shut down for summer vacations. Many of these shutdowns are going to be stretched out for a week or more beyond the end of the vacation period this year, either because manufactured product inventories are too high or simply for lack of orders. Last summer steel buyers kept their receiving departments open to take in scarce steel shipments. Because they don't want any during this summer's shutdowns, July shipments will show a noticeable seasonal decline.

STEEL users are still knocking down their steel inventories. Their own business is off somewhat from a year ago except for automobiles. It is estimated that actual orders for things made from steel today would support less than the current operating rate. Some firms have cut back inventories to a point less than operations—but this is not the general rule this week.

A question that keeps popping up often these days in steel circles is the difference between the operating rates of large and small steel companies. To those who have been in the business since 1937 this isn't new. There are at least three reasons why smaller firms are running at much lower rates than their big competitors, and the first is most important: (1) Product mix, (2) location and (3) customer relationships.

If a big steel company made nothing but bars, wire, alloy and stainless steel it might not today be able to push its operations above the 50 pct mark. But where the decline in these products can be offset by flat-rolled and by pipe and tubing business, that company can operate at a much higher level. And no matter what the product, if a mill is too far from a good part of its market and can't absorb freight its production is suffering. The Pittsburgh and Youngstown ingot operating rates compared with that at Chicago prove this point.

The way in which steel companies treated their customers during the postwar period is now making itself felt too. Previous premium prices, where they were obviously warranted, are not having much effect on current business if the price is now competitive. But where premium prices appeared excessive and undeserved the customer today is treating the steel salesman as he would an erstwhile gray market auto dealer.

THE steel operating rate was still slipping this week. Were it not for the support of the automotive industry the current rate might be somewhat lower. This week there was no sign that the heavy demand for steel from Detroit was on the wane. But there were some who figured that later in the year it might not be so strong. Time will tell. This week the rate is off another 2 points to 84.5 pct of capacity.

The steel scrap market is again indicating the poor outlook for steel over the balance of this year. No. 1 heavy melting steel was off $1.00 at Pittsburgh and the same amount at Philadelphia. This has dropped THE IRON AGE steel scrap composite 67¢ a gross ton to $20.25. Since the first of this year the composite has dropped $22.75 a gross ton. Large steel firms still have big stocks yet to work off. Scrap is coming to them from fabricating shops by direct shipment. Buying from dealers and brokers is at a minimum.

Nonferrous markets are still weak, with prices still pointed down. Prices were shaved again last week on copper and zinc. For copper this was the ninth reduction since Mar. 29 when price cutting began. The reduction on zinc was the 11th since Mar. 23. Weak demand and resulting price cuts have already forced some of the higher cost operations to be curtailed. More production cutbacks can be expected if prices dip further.

Hughes-Keenan Corporation Increases Truck Payloads 20% with J&L OTISCOLOY high-strength steel

J&L STEEL

(Above) *Spot-welding a truck roof-reinforcement and bow assembly, made of* J&L *Otiscoloy steel, at the Hughes-Keenan Corporation, Delaware, Ohio. Both the panel and bows are cold formed.* (Left) *Truck bodies on the Hughes-Keenan assembly line.*

Builds stronger, longer-lasting truck bodies with less steel

Eliminating 20% of the deadweight from milk truck bodies is not the only advantage in using J&L Otiscoloy high-strength steel, according to Hughes-Keenan Corporation, Delaware, Ohio.

For good sanitation, milk truck bodies must have their interiors steam-cleaned every day. Moisture from melting ice refrigeration during milk delivery is always present. Normally the continuous wetting and drying would cause rapid corrosion in a milk truck body made of mild steel.

Otiscoloy resists rust four to six times as effectively as mild steel. This pays off to the truck owner in longer service life. And it pays off to Hughes-Keenan Corporation in having a better quality, lighter, longer-lasting truck body.

The quality in these truck bodies does not entail added production costs. Although high-strength steel is more expensive than mild steel, Otiscoloy is used two gauges lighter with equal or greater strength than ordinary mild steel. Four sections can be made from Otiscoloy where only three sections of equivalent strength could be made from the same weight of mild steel. More units are produced per ton, freight costs are reduced, units are lighter, easier to handle during production.

Otiscoloy is recommended for applications where strength without bulky weight is desired—also where corrosion, abrasion and fatigue are problems in the service life of equipment.

Otiscoloy can be formed hot or cold, welded, forged, flame-cut and otherwise worked by standard methods. Here is a *modern* steel that is worth *your* investigation. Why not return the coupon to us today?

Jones & Laughlin Steel Corporation
403 Jones & Laughlin Building
Pittsburgh 19, Pa.

Please send me at once a copy of your booklet, "Otiscoloy High-Tensile Steel."

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L *manufactures a full line of carbon steel products, as well as certain products in* OTISCOLOY *and* JALLOY (*hi-tensile steels*).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

Railroad Freight Car Buying Returns to "Normal" With A Bang

Boom or Bust Industry Will Start Closing Shops As Backlogs Disappear

o o o

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • **The railroads'** freight car buying pattern has apparently returned to "normal" but unfortunately for carbuilders and steel companies, it has done so with an awful bang. Traditionally the roads don't buy when their business is off. Carloadings are about 11 pct below what they were a year ago. Car buying has fallen faster: The 3083 cars ordered by American railroads during the first 5 months of this year are less than a third the amount delivered in June alone. Total deliveries to June 1 were 51,450 cars.

Unless there is an unexpected spurt in orders the independent carbuilding shops will begin shutting down next month for lack of orders. Two have already been announced. Pressed Steel Car Co. will shut its McKees Rocks, Pa., plant for about a month beginning late in July and its Mt. Vernon, Ill., shops will be closed in August.

The bigger companies have relatively larger backlogs than the smaller firms but their operations are spotty. Some of their shops will be cut to 50 pct of capacity or less to avoid shutdowns in July. They are either doing this voluntarily to cushion the shock or because the railroads don't want the cars as fast as they can be produced.

At the present rate of ordering not more than four or five shops out of the 20-odd in the country will be building new cars during the fourth quarter of this year, and only two will run on into 1950.

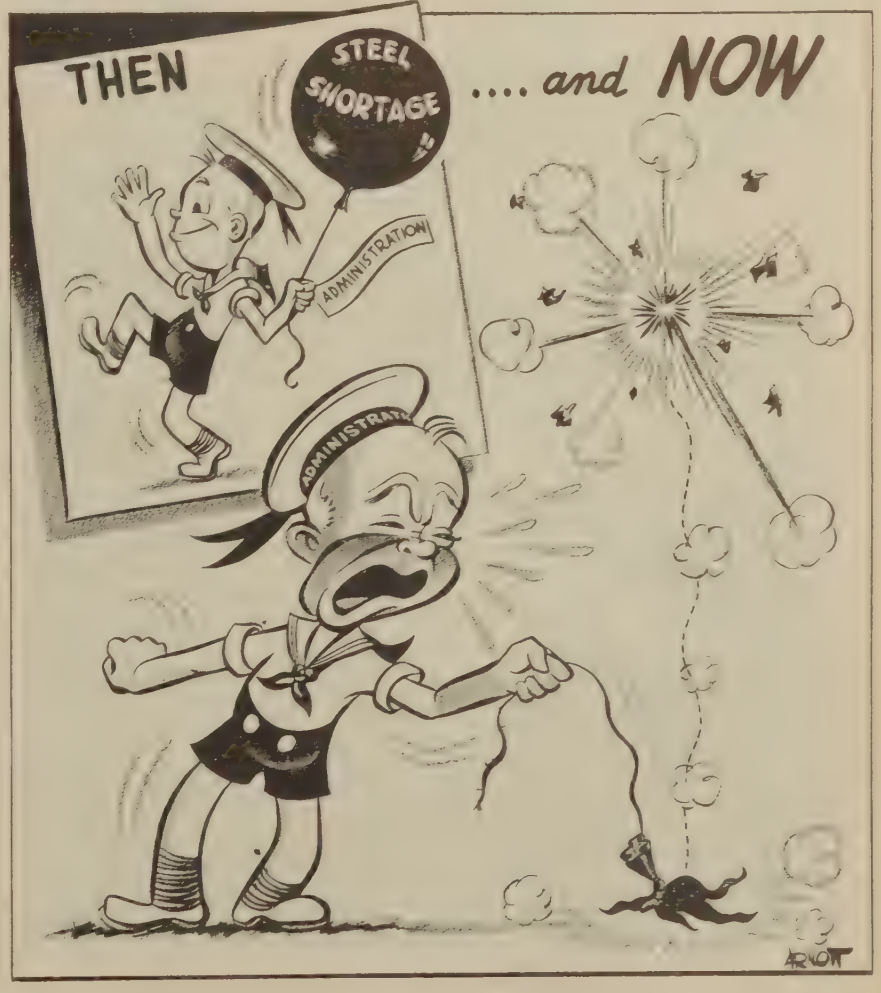
In "normal" times, when a shop is running it can start shipping cars 60 days after receipt of an order. If the shop is down it may take 90 days or more. The independent carbuilders are therefore scurrying around for export orders and repair business.

The export market has turned sour. Some 27,721 cars were exported in 1947. Last year the figure was 1570. In the first 5 months of this year 294 cars were exported, leaving a backlog of 1781. Chances for new foreign orders are getting slimmer because: (1) English, French, Dutch and Belgian shops have been rebuilt to take care of their own and some export business; (2) South Africa, which was inquiring for 3500 gondolas and 500 box cars has since decided to expand its facilities and build the cars there; and (3) South America markets are good but the eternal dollar shortage stymies business there.

Carbuilders are digging hard for repair work. At one shop, scheduled to close during July for lack of new car orders, enough repair business has been drummed up to keep it running on into September. This not only keeps the plant out of the red but leaves it ready to quote good deliveries on new inquiries.

The independent carbuilders have lost a lot of business to the railroads' own shops during the past year. Normally they build 80 pct of the cars. So far this year they've built 74 pct of them. There were 51,450 cars delivered during the first 5 months of 1949, of which the independent shops built 37,887 and the captive shops 13,563. Current backlogs are worse for the carbuilders: 27,931 cars on order in independent shops; 24,350 in captive shops. This is a 53-47 ratio.

The railroads say they can build cheaper than the independent shops. The latter claim that their greater



efficiency would more than offset the profit they add if the roads charged the proper building, equipment and supervisory overhead to their cars. Now that the railroads have to grant an increase of 7¢ per hr to non-operating employees, retroactive to Oct. 1, 1948, and give 48 hr pay for a 40-hr week, effective Sept. 1, 1949, the actual labor cost of carbuilding in captive shops may make the independents definitely competitive. They may of course have a wage increase of their own to worry about but they hope to wind up ahead on the deal.

It has been suggested that the railroads consider cars expendable, carrying a depreciation account for each car and replacing it when it is depreciated. This would set up a regular buying pattern that would stabilize the carbuilding industry, avoid boom and bust and lower average car prices. It might also show up the inefficient shops which now hang on in bad times, begin taking business at cost when it picks up and then show a fair profit when railroad buying is heavy.

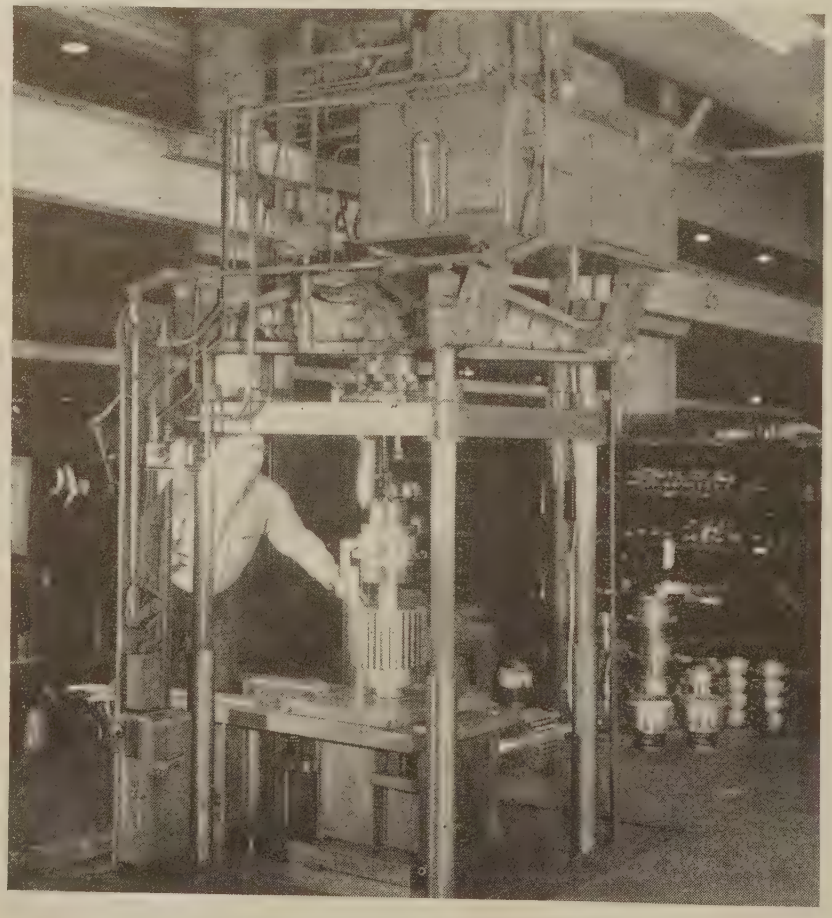
Railroad people say they can't justify buying when they are either losing money or getting a very low return on their investment. Right now there is some reason to believe they may be holding off for lower prices too. A $5 a ton steel price cut on a 20-ton car would amount to about $100 per car. This is only $4 a year in the 25-year life of a car. But it is $100,000 on a 1000-car order.

Aluminum Ladder Price Cut

Worthington, Pa.

• • • **Aluminum Ladder Co.** has reduced prices on most of its aluminum industrial ladders following a retooling program designed to cut production costs. Most step ladders were reduced 5 pct while some other industrial ladders were cut by as much as 27 pct.

EASY DOES IT: *Preparing to press a commutator on an armature core of a 140-hp trolley coach motor by means of a Baldwin 75-ton hydraulic press. Precise positioning of the commutator is accomplished by means of a guiding template held by the operator and the single press control lever. A rolling base plate with 30-in. travel carries work in and out of the press. Springs on the table relieve press loads on the rollers.*



Steel Authorizations Under Marshall Plan Total $129 Million

Washington

• • • **Of the $50 million** worth of steel mill materials and products shipped under the Marshall Plan up to and through Apr. 30, 92 pct was of United States origin. Procurement authorizations totaled $129 million.

Terne and tinplate shipments, valued at $17.6 million was the leading commodity shipped by the United States.

Value of shipments of other commodities from this country were: Bars and rods, $7.54 million; plates and skelp, $6.04 million; sheet and strip, $2.93 million; ingots, billets, blooms and slabs, $2.15 million; railroad track materials, $1.94 million; tubular goods, $1.74 million; ferroalloys, $1.3 million; structural shapes, $1.28 million; wire and wire products, $574 thousand; and, other metal including wheels, axles, castings, forgings, $325,000. Pig iron shipments totaled $9000 and scrap, $221,000.

Receives Army Contracts

Buffalo

• • • **The Army** has awarded three contracts for fence posts and barbed wire, steel rounds and small automotive parts in the Buffalo area.

Bliss & Laughlin, Inc., has been awarded a $213,246 contract for 4,169,000 lb of steel rounds.

Buffalo Steel Co. of Tonawanda received an award of $250,160 for 700,000 fence posts and barbed wire.

Trico Products Corp. has received a contract for $110,184 worth of small automotive parts for the Army's Detroit ordnance district.

Jersey Utility Expands

Washington

• • • **More than $15 million** will be spent in expansion by the New Jersey Power & Light Co. before the end of 1951. In a statement filed with the Security & Exchange Commission, the utility said it planned to spend $8,275,000 in 1949, $3,740,000 in 1950, and $3,278,000 in 1951.

Pig Iron Price Testing Due After Steel, Coal Negotiations Are Settled

o o o

By D. I. BROWN
Chicago Regional Editor

o o o

• • • **Consumers keep talking** about lower pig iron prices. Nothing has been done yet by major producers and won't until after the twin hurdles of Mr. Murray and Mr. Lewis are negotiated. Producers say no lower costs have appeared anywhere in making iron and therefore they cannot cut the price. Consumers declare pig iron prices are greatly inflated just as were scrap prices. The producers say that lower prices won't sell more iron because the foundries don't want it. Consumers agree that token cuts in price won't mean a thing to them but a substantial slash would perk up the iron business.

It is a well known fact that foundries are using the cheaper scrap, averaging around $25 in preference to the $46.50 iron. They would no doubt sweeten their iron charge at the right iron price. Nobody has yet tested this market pricewise, but eventually this will have to be done.

Defending the present pig iron price makers point to higher labor costs, higher ore and coal costs, etc. and state that for these reasons pig iron prices can't come down. Mining costs or smelting costs of zinc, lead and copper didn't come down, but the price certainly did. Somewhere, nonferrous prices will regain their proper significance, but so far they have completely lost their normal relationship to the commodity. This can and will happen in other products.

In the past, iron prices have varied plenty. In 1920 the annual average delivered quotation for No. 2 foundry iron in Chicago was $43.25. The annual average quotation for 1921 was $24.05. When a producer built up an inventory which wasn't moving, he usually had to bank the stack or offer the pig at a price which would move it. Often this price was not a profitable one but all factors considered it became a more economic choice to continue to operate and sell the iron for no profit, or even at a loss. When a stack goes down so do some of the coke ovens. This means usable gases from both coke ovens and blast furnaces are not available. If a plant then has to buy natural gas to replace that which they formerly generated themselves, the overall profit or loss from iron must be adjusted to consider this. Further, when coke ovens are banked the volume of saleable byproducts diminish and this debit must then be balanced with the pig iron price. Also, the overhead of fanning a blast furnace until the price gets right can be a losing proposition.

Behind the scenes consideration of pig iron prices include much more than the selling price of the pig. Right now, it is evident from talking to steel companies that the largest single factor causing them to cling to an admitted precarious iron price, is the whole steel picture.

If they cut pig iron prices everyone will demand a steel price cut, or at least stop buying steel in the natural expectation of a decline in price. The steel companies won't cut steel prices until they have to in order to sell. Further, they can't intelligently consider their steel price structure until Mr. Murray and Mr. Lewis hazards are passed. For the moment, then, it appears all the talk is wasted because it is still premature. However, in August or before, consensus here is that the iron prices will be tested—but good.

Illinois Employment Drops

Chicago

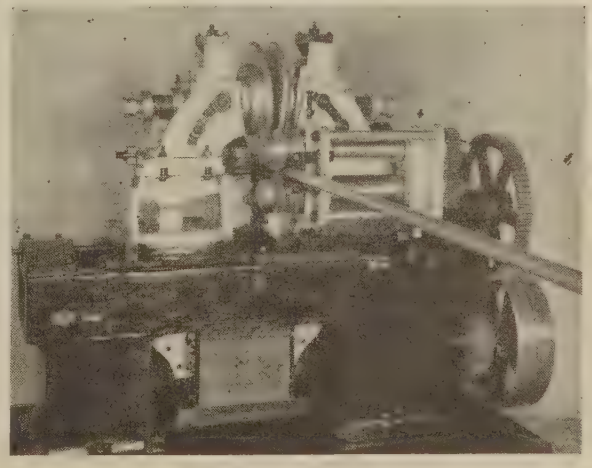
• • • **In June** manufacturing employees in the state of Illinois declined for the sixth consecutive month. On Mar. 15 the total employed dropped to 1,171,100 persons, which is the lowest level in the state since July 1946. On Mar. 15 there were 102,000 fewer manufacturing workers employed than during the month of December 1947, which was the peak month of postwar manufacturing employment in this state.

Commons Will Keep Clean

Pittsburgh

• • • **Though MP's fume** while Churchill smokes and the Thames is blanketed by smog his Majesty's Government wants clean air for its lawmakers. Word from London has it that a Precipitron, electronic air cleaner, will be installed in the House of Commons, in the wing where war damage is being repaired. The cleaner is being built in England under Westinghouse license.

GRANDPA: *The first electric resistance welder for welding light wall tubing was constructed by O. Parpart in* 1896 *and this machine is owned by Michigan Steel Tube Products Co., Detroit. In* 1921 *came the Johnson process, coordinating the elements of heat, pressure and time to produce a weld with* 100 *pct penetration.*



Industrial Briefs . . .

• MOVING HEAVEN AND EARTH —A vivid record of the life and accomplishments of R. G. LeTourneau, president of R. G. LeTourneau, Inc., Peoria, Ill., is told in a new biography entitled "Moving Heaven and Earth" by Donald F. Ackland of London. The book describes the man who now divides his time between directing four plants in the United States and one in Australia and following a 5000-mile-a-week traveling schedule to fulfill religious speaking engagements.

• READY TO SERVE — John D. Tebben, 20869 Mound Road, Detroit, has announced the opening of a new company to do consulting work in engineering sales and industrial relations. Mr. Tebben was formerly general sales manager of P. R. Mallory Co., Detroit, and vice-president of S. M. S. Corp., Detroit.

• PRODUCTOS DE ACERO — National Supply Co., Pittsburgh, has formed a Venezuelan subsidiary, the National Supply Co. of Venezuela, C. A., with headquarters in Caracas to handle its products as well as those of its British associate, Oil Well Engineering Co. T. B. Herndon is manager of the new subsidiary.

• NOW FABRICATING — U. S. Steel Supply Co. has announced their entry into the concrete reinforcing bar fabricating business in Pittsburgh, Boston, Cleveland, Chicago and St. Paul. The company has secured the services of most of the personnel and acquired all the fabricating equipment of the Concrete Bar Div. formerly operated by Carnegie-Illinois Steel Corp. in Pittsburgh and Chicago.

• NEW NEIGHBOR—Brown-Wales Co., Boston, steel warehouse distributers, has announced that ground has already been broken for the erection of a new warehouse and office building on Rindge Ave. Extension in Cambridge.

• BAR SALES — Jersey Shore Steel Co., Jersey Shore, Pa., manufacturers of rail steel merchant and reinforcing bars, has announced the appointment of Fred A. Dirkes, 210 Van Brunt St., Brooklyn, as their New York sales representative.

• MIGHTY LABORS—The Industrial Engineering College of Chicago has announced the availability of a number of additional prints of their 34 min sound and color film "Mighty Labors." It includes time study, motion study, job evaluation, wage incentives, process charting and plant layout.

• CARTER WINS—The Hydraulic Institute has presented an award to Roy Carter of Worthington Pump & Machinery Corp., Harrison, N. J., for his paper on Starting Torque Characteristics of Centrifugal Pumps which received first prize in the Practical Papers group.

• LARGER QUARTERS—Technical Metal Processing, Inc., commercial metal joining and induction heat treating plant, has moved into new and larger quarters at E. 55 St. and Lake Court in Cleveland.

• FASTENER AGENT—Air Associates, Inc., has been appointed a distributer of aircraft speed nuts and speed clips by Tinnerman Products, Inc., Cleveland. Air Associates will maintain stocks of their items in their warehouses in Los Angeles, Dallas, Chicago and Teterboro, N. J.

• BRAZING DISTRIBUTER — The American Platinum Works of Newark, N. J., has announced that it will be represented by Steel Sales Corp., 3348 South Pulaski Road, Chicago, for the distribution of silver brazing alloys and fluxes in Illinois, Michigan, Indiana, Missouri, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Nebraska and Kansas.

Business Survey Shows Delivery Improvement, Shorter Buying Policy

Chicago

• • • **Inventories** are falling faster than production according to the report of the business survey committee of the Purchasing Agents Assn. of Chicago. Reporting on the month of May, the survey showed that deliveries are continuing to improve and that buyers are adopting a shorter buying policy. It is also reported that there is no indication that the bottom of the downward trend has been reached.

Among other things, prices generally continued their downward trend, employment is decreasing and production is following the dip in employment. Aside from the regular questions asked in the survey, a special question was included in the survey for May. The purchasing agents canvassed were asked "what percentage in dollar volume were your purchases this month compared with 6 months ago and 1 year ago." For the 6 months ago figure the average percentage was 64, and 1 year ago it was 61 pct. The reasons for this percentage change in volume were 54 pct shorter buying policy, 36 pct change in production, and 10 pct was due to miscellaneous causes.

Purchases Tonawanda Firm

Buffalo

• • • **John H. Dasher** of Buffalo, one of the organizers of the Jamestown Metal Desk Co., has purchased the Tonawanda Engineering Co. from a group of stockholders.

The property consists of a plant, foundry and machine shop with a present employment of 20 workers. Mr. Dasher plans to form a new company to operate the business.

Releases Film for Students

Milwaukee

• • • **Allis-Chalmers** Mfg. Co., here, has released a new 16 mm sound film in color, "The Hidden World." The movie is slanted to the young engineering student and scenes include hundreds of industrial applications and processes. Running time of the film is 26 min.

Auto Industry Not Due To Cut Peak Production Now

° ° °

By W. G. PATTON
Detroit Regional Editor

° ° °

STILL BUSY: *Plants like the Chevrolet-Bay City plant where scores of small auto parts are produced in huge quantities continue to operate at peak postwar production rates. The auto industry expects good business through August; what the market will be after Labor Day is admittedly anybody's guess. Shown in the photograph is the screw machine room of the Bay City plant.*

Detroit

• • • **The auto industry** is aware of persistent reports of a slip on many U. S. economic fronts but it has no intention of cutting its peak production schedules until it has better evidence that the market for automobiles is sagging.

A strike among Detroit auto producers or a work stoppage in the coal or steel industries will undoubtedly throttle car production in a hurry. However, the industry sees no reason for a sharp drop in sales during the months immediately ahead unless some development, not now foreseen, suddenly overtakes the U. S. economy.

Several car producers who are operating today near their all-time peak have indicated that every effort will be made to continue the present rate of operation through to the end of the year 1949.

"We hope we're not fooling ourselves," one leading auto executive told THE IRON AGE. "However, the evidence we have available at the moment justifies both our present production schedules and our optimistic view of the future."

Elaborating on this view, it was pointed out that despite curtailed industrial activity in many parts of the country, reports from dealers in the same areas indicate that car sales are running well ahead of a year ago. These reports, available several times each month, would quickly indicate any large scale piling up of cars in the field, it was explained.

"We haven't a single dealer today who would not accept—and sell quickly—an extra car if we were in a position to offer it to him," according to this executive.

The rate of turnover on new cars of dealers representing this particular manufacturer is a matter of 2 or 3 days, it was explained. Used car turnover is at an even more rapid rate. The ratio of used car sales to new car sales is still only about one fourth as much as the prewar figure. This ratio is used by many auto executives as a barometer showing the selling effort required to move automobiles.

Justifying the industry's present high production schedules, auto executives point out that, up to the present time, most auto firms have not had available enough steel to permit them to over-produce. Now steel is no longer the bottleneck; some auto plants are finding it necessary for the first time to add a second shift to work out tight spots in the production line. Such measures are, of course, only temporary.

One of the surprises here is the fact that even independent car producers who were supposed to be topheavy with stocks in dealers' hands continue to produce close to peak levels. According to Ward's estimates, through the first 5 months of 1949, U. S. and Canadian production was 16 pct ahead of a year ago. During the week ended June 11, car output was nearly 23 pct ahead of 1948 and the leading producer, General Motors, was assembling in U. S. nearly 38 pct more cars than were being built a year ago.

Today's car production figures, of course, do not mean steel business tomorrow, and local steel suppliers are more concerned about car sales in the autumn than the present rate of car production. This is a subject of wide speculation by the auto industry which is well aware that strikes may change the present picture almost over night. The industry also readily admits it cannot stand alone for long in an economy that is coming apart at the seams.

Most local steel suppliers figure roughly that steel ordered today will be delivered in July, manufactured in September and the car will be sold in October. Thus, a steel supplier is usually talking about the auto business 4 months ahead of today. This view of the situation is obviously quite different than the present highly satisfactory auto production rate.

Except for flat-rolled products, most steel items in Detroit are, for all practical purposes, easy. A number of small stamping plants and screw machine shops are operating close to depression levels. The same can be said for many foundries, including some shops that turn out a lot of automotive production work.

Parts and accessory plants which supply both original and service parts are, as a whole, not too much affected up to the present time. Informed sources agree that since

January the output of auto parts supplier plants has fallen by 10 to 12 pct. The prospect is that these units will fall another 5 pct in the next month or two. Earlier in the year, the drop in business volume was attributed to inventory balancing and the fact that car owners were simply refusing to spend a nextra $100 or $200 to keep the old bus running.

A decline in service business now appears to have pretty well run its course. At least part of the decline in the auto parts business during the next few months will come from inventory adjustments or reduced production schedules by car manufacturers.

Thus far, the most significant breaks yet to occur in the auto market have hit the truck and service parts business. Truck sales, 1½ ton and over, continue to be slow and spotty. However, where dealers have been working on fleet users, offering the same kind of deals that were common in the prewar era, the results have been highly promising, it is reported.

"Some truck dealers have cut their profit margin substantially," a fleet buyer told this reporter. "Last week we bought ten new trucks and we plan to buy more if the present offers are continued."

Most observers agree that aggressive selling of trucks is already here. It is only a matter of time until the same tactics will be used to move passenger cars, they say. These sources emphasize the fact that price cuts available through increased trade-in allowances or dealer discounts are much more substantial than the comparatively small price reductions offered thus far by car and truck manufacturers.

Steel costs are being pared at every opportunity. The amount of steel arriving by truck and water is being increased as rapidly as conditions permit. Steel buyers are insisting upon—and getting—the best quality of steel they have had since the war. Scrap losses are less than at any time during the postwar adjustment period.

Model changes will not seriously affect the steel requirements here this year, it is believed. The new Buick special, scheduled for introduction during August, will simply replace the model that was discontinued earlier this year. A new General Motors "C" body will come along late in the year and may temporarily affect car output at Cadillac, Oldsmobile and Buick. Other car producers, it is expected, will have only limited model changes that can easily be taken in stride, according to the best available information.

Zinc Price Reduction Reflected in Lower Quotations for Pipe

New York

• • • **Reflecting reduction** in price of zinc, U. S. Steel Export Co., U. S. Steel subsidiary, announces the following new prices with freight included to New York, Philadelphia or Baltimore.

These prices will apply on carload lots and are effective with shipments made from the mills on and after 12:01 a.m. June 10, 1949. Prices are subject to seller's current list of extras and deductions and conditions of sale. All sales are subject to seller's prices in effect at time of shipment.

	Pct
American Standard Pipe, T & C	
Buttweld 2½-in. and 3-in. Galvanized	26.6
Seamless, 3½-in to 6-in. Galvanized	19.1
English Gas Tubes, T & C	
Buttweld, 2½-in. and 3-in. Galvanized	28.5

Dravo Engineer Reports On Waterways Potential

Pittsburgh

• • • **An engineering** study soon to be presented by Dravo Corp. indicates that about 100 million people in North and South America now are or may be benefited by their proximity to inland waterways transportation. The study was prepared by Albert J. Dawson, chief engineer of Dravo's marine department. It will be given before the first Pan-American Engineering Congress, July 15 to 24 at Rio de Janeiro.

The congress, which is sponsored by the South American Union of Engineering Associations, in cooperation with several U. S. engineering groups, was formed to discuss engineering problems affecting the development of the American continents.

Morris L. Hicks, sales manager of Dravo's engineering works division, will present the paper at the meeting. It traces the evolution of the different types of river equipment and their operating characteristics. About 60 million North Americans and 40 million South Americans either benefit now or may some day profit by their proximity to economical water transportation, according to the study.

Coming Events

June 27-30	**American Electroplaters Society,** annual meeting, Milwaukee.
June 27-July 1	**American Society for Testing Materials,** annual meeting, Atlantic City, N. J.
July 11-16	**Concrete Reinforcing Steel Institute,** annual meeting, White Sulphur Springs, W. Va.
July 17-19	**Institute of Scrap Iron & Steel,** midyear meeting, Atlantic City, N. J.
July 20-22	**Pressed Metal Institute,** annual convention, Cleveland.
Sept. 14-16	**Porcelain Enamel Institute,** annual forum, Columbus, Ohio.
Sept. 25-Oct. 1	**American Institute of Mining & Metallurgical Engineers,** midyear meeting, Columbus, Ohio.
Sept. 26-28	**National Electronics Conference,** Chicago.
Oct. 3- 5	**American Coke & Coal Chemicals Institute,** annual meeting, Skytop, Pa.
Oct. 4- 6	**Industrial Packaging & Materials Handling Exposition,** annual convention, Detroit.
Oct. 10-14	**American Society for Testing Materials,** West Coast meeting, San Francisco.
Oct. 12-15	**Electrochemical Society,** semiannual meeting, Chicago.
Oct. 13-15	**Foundry Equipment Manufacturers Assn.,** annual meeting, White Sulphur Springs, W. Va.
Oct. 17-21	**National Metal Congress,** Cleveland.
Oct. 24-26	**American Gear Manufacturers Assn.,** annual meeting, Chicago.
Oct. 26-28	**National Metal Trades Assn.,** annual convention, Chicago.
Oct. 27-28	**Gray Iron Founders Society,** annual meeting, Chicago.

ECA Authorizations Total $2.5 Billion With 60 Pct Shipped

Washington

• • • **A potential** $2.5 billion worth of industrial orders was authorized during the first 14 months of the Marshall Plan. About 95 pct of machinery and equipment orders and 65 pct of other industrial goods were to be placed with United States suppliers.

In a report showing cumulative totals through June 1, the Economic Cooperation Administration listed the overall figure (all commodities) at $5.57 billion. Ocean freight charges added another $457 million to the bill.

About 60 pct of all industrial authorizations had been shipped as of June 1.

As of that date, purchase authorizations for iron and steel mill materials and products, including ferroalloys totaled $147.4 million. Other categories (in millions of dollars) included:

Nonferrous — copper, $157.7; aluminum, $63.8; zinc, $55.1; lead, $49.9; brass and bronze, $7.5; nickel, $5.6; and miscellaneous, including precious, $5.9.

Machinery and equipment—construction and mining, $87.2; machine tools, $55.1; other metalworking, $42.2; agricultural, including tractors, $84.4; other tractors, $17.3; electrical machinery, $39.9; industrial, including office, $142.2; and miscellaneous, $27.1.

Transportation—motor vehicles, parts and accessories, $109.3; aircraft, parts and accessories, $49.7; and unclassified, $42.1.

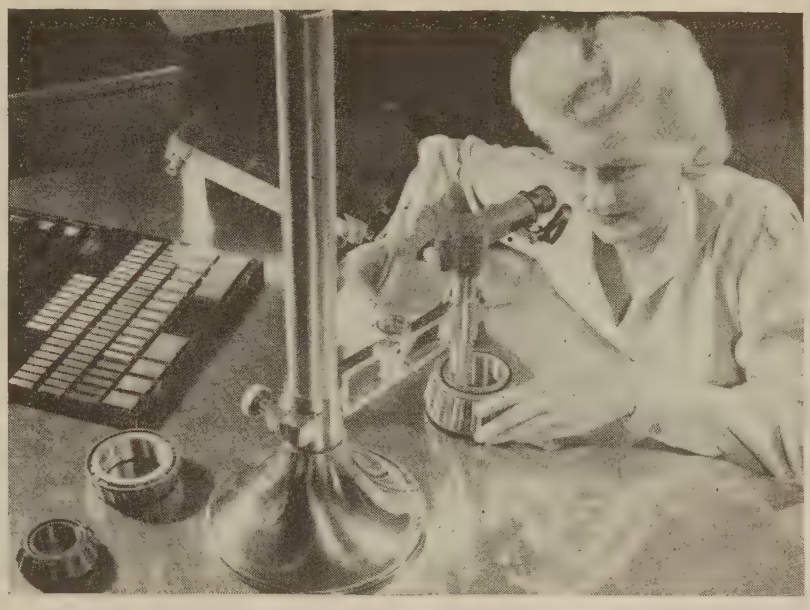
Plan '50 Trade Fair

Detroit

• • • **Leading industrialists** here are hoping to stage a huge International Trade Fair during the summer of 1950.

John S. Coleman, president of Burroughs Adding Machine Co., heads the committee on arrangements and Detroit's major industries are ready to offer strong backing to the project.

In some respects, the proposed Fair will be modeled after the Toronto International Trade Fair. Present plans call for opening the Detroit Fair a few days after the 1950 Toronto Fair has closed.



Timken Opens Wide Its Doors

Canton, Ohio

• • • **Another chapter** in the successful community relations of Timken Roller Bearing Co. was being written this week as some 60,000 guests ranging from customers to custodians, and the working press, visited the company's plants in an "open house" inaugurating the 50th anniversary celebration of Timken Roller Bearing Co.

For the first time in its history, Timken is opening its doors to the entire public in the communities and surrounding areas of Columbus, Zanesville, and Wooster, Ohio; Colorado Springs, Colo., and St. Thomas, Ont., Canada.

A feature of the "open house" is the absence of forms, tickets, guided touring and other restrictions. The complete Timken organization is open, including every plant, department and office, whether it is on the route of the regular tour or not.

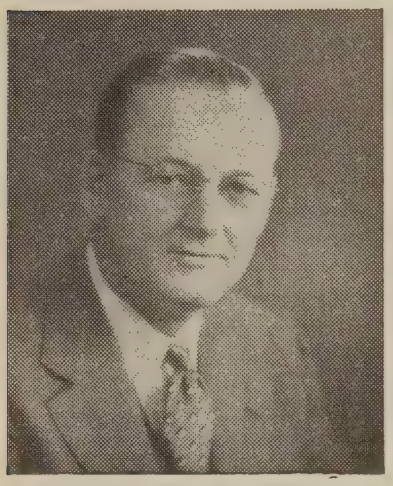
Visitors proceed on their own as they arrive at the main gate, moving along a well-marked tour route. Attendants are stationed at strategic points to provide information and be of general help to guests otherwise.

All essential bearing factory operations and a complete view of steel mill processes including melting, rolling, and finishing are included in the tour.

William E. Umstattd, Timken president, termed the "open house" the most unconditional the company has ever held.

Other features included lowering of the minimum age requirement of visitors to 12 years, provided they are accompanied by an adult, and a reproduction of the first Timken bearing factory, steam operated and manned by people dressed in the fashion of more than 40 years ago, making Timken bearings as they were first made at the turn of the century.

At a press conference preceding the press review of the "open house," Mr. Umstattd told reporters that the company's present steel making operations had dropped to 32 pct of the Jan. 1 level. He said prospects for a pickup in alloy steel sales are not good because "during the war when many of the alloying elements were unobtainable, customers made engineering changes in their products permitting the use of carbons" thus reducing segments of the alloy steel market. The photo shows an inspector measuring a cone assembly.



President, James H. Smith

Malleable Founders Stress Market Need

Shrinking Output and Backlogs Seen Forcing Search for Markets; Ductile Iron Discussed

By BILL PACKARD
News Editor

Hot Springs, Va.

• • • **Need for developing** markets was stressed above every thing else at the annual meeting of the Malleable Founders' Society here June 16 and 17. This urgent need was vividly described by retiring president Collins L. Carter, president of Albion Malleable Iron Co., who told his audience that the malleable industry has been guilty of keeping its light under a bushel basket.

Mr. Carter said recent months had seen founders making a strategic retreat from a sellers' market to a buyers' market. Production is off 13 pct. Backlogs have shrunk 50 pct. Output for the industry will probably be off 25 pct this year, he predicted. At the same time he expects general business to decline only 10 to 15 pct. "This is our problem," he said.

He urged each company to develop a specific plan to cope with this problem. He outlined several possible steps in such a plan. Cost control can be achieved through cutting down on waste. He stressed quality control even more. The recent period of heavy demand has caused emphasis to be placed on output at the expense of cost and quality, he said.

"Variations in quality raise costs. We know how to make good products but lack of quality control has caused us to lose some business to our competitors. There is no substitute for quality."

Mr. Carter offered a word of caution on mechanization. "Labor saving machinery has its place in bringing about lower casting costs. But proper organization and control are much less expensive and very often will accomplish the same result."

Nodular graphite iron rivaled market development for top billing at the meeting. The Malleable Founders' Society has engaged the Southern Research Institute of Birmingham to carry on a research project on it. Dr. W. H. Austin was here from the institute to report on this project. He cited three chief aims of research:

(1) What are the potential competitive results of nodular graphite iron?

(2) What are the advantages and disadvantages to malleable founders of using this type iron?

(3) What new products of nodular graphite iron can expand the markets of malleable founders?

All malleable founders are keenly interested in this subject. That's an understatement. They are aware that this ductile (as cast) iron might eventually cause vast changes in their industry—for better or worse. It has many of the good qualities of malleable iron, without having to be annealed.

Dr. Austin reported that research so far conducted indicates the new iron is applicable for production of many types of ferrous castings. His attitude was one of caution, indicating that there is still a great deal to be learned about it.

Consensus of malleable iron founders on nodular graphite iron seemed to include the following:

(1) Many claims have been made regarding it.

(2) Some of them now appear to have been premature.

(3) Those interested now appear more cautious. They are confining their expressions to the limited technical information available.

(4) It is too early to state fully the practical applications of the iron.

(5) Other groups interested in the iron were listed in this order:
International Nickel Co., American Cast Iron Pipe Co. and the Mehanite group.

Heading new business was the election of officers. James H. Smith, general manager of Central Foundry Div. of General Motors Corp., became the new president. In accepting the honor, he outlined the program for the coming year and urged the industry to strive for a million tons of castings.

Other officers elected are: Vice president, Ralph T. Rycroft, Sr., president of Kencroft Malleable Co., Inc., Buffalo; treasurer, Dudley V. Walker, Eberhard Manufacturing Co., Cleveland. Lowell D. Ryan was reelected managing director and James H. Lansing was reelected technical director.

The McCrea award was presented to Anthony Haswell.

•

Now Making Ductile Iron

New York

• • • **Ductile cast iron** (THE IRON AGE, Feb. 17, p. 77) is now being produced by numerous foundries throughout the country, according to International Nickel Co. Some of the companies licensed

under pending patent applications to produce this new material are:

Albion Malleable Iron Co., Albion, Mich.
The Anstice Co., Inc., Rochester, N. Y.
Atlas Foundry Co., Irvington, N. J.
Benton Harbor Malleable Industries, Benton Harbor, Mich.
Bison Castings, Inc., Buffalo.
Chambersburg Engineering Co., Chambersburg, Pa.
Cooper-Bessemer Corp., Grove City, Pa.
Dostal-Per Mold Foundry Co., Pontiac, Mich.
Francis & Nygren Foundry Co., Chicago.
Kutztown Foundry & Machine Co., Kutztown, Pa.
Lynchburg Foundry Co., Radford, Va.
Motor Castings Co., Milwaukee, Wis.
Noblesville Casting Co., Noblesville, Ind.
Pitz Foundry, Inc., Brooklyn.
Prospect Foundry, Minneapolis.
Ritter Company, Inc., Rochester, N. Y.
Sacks-Barlow Foundries, Inc., Newark, N. J.
James Spence Iron Foundry, Jersey City, N. J.
Sterling Foundry Co., Wellington, Ohio.
Straight Line Foundry & Machine Co., Syracuse, N. Y.
Texas Foundries, Inc., Lufkin, Tex.
Treadwell Engineering Co., Easton, Pa.
Youngstown Foundry & Machine Co., Youngstown, Ohio.

The new material combines the process advantages of gray cast iron, such as fluidity castability and machinability, with the product advantages of cast steel and is characterized by a graphite structure in the form of spheroids. Its excellent mechanical properties, particularly high elastic modulus, high yield strength and ductility, have suggested many potential applications for this ductile cast iron in various industries.

Construction Steel

• • • **Fabricated steel awards** this week included the following:

1800 Tons, Philadelphia, 2 apartments for M. I. Blum, through Turner Construction Co., to Lehigh Structural Steel Co., Allentown, Pa.

1180 Tons, Dallas Co., Tex., Trinity River bridge to American Bridge Co., Pittsburgh.

800 Tons, St. Paul, manufacturing building for Minnesota Mining & Mfg. Co., to Paper, Colmenson & Co., St. Paul.

260 Tons, Biddeford, Me., St. Francis Hospital through George A. Fuller Inc., Boston, to Groisser & Shlager Iron Works, Somerville, Mass.

260 Tons, Boston, South End, Chinese merchant building through Matthew Cummings Co. to Groisser & Shlager Iron Works, Somerville, Mass.

220 Tons, Vermillion Co., Ill., State highway bridge Section 34-Z-1sF to Milwaukee Bridge Co., Milwaukee.

220 Tons, Montgomery Co., Ill., State highway bridge Section 117-1SF to Milwaukee Bridge Co., Milwaukee.

220 Tons, Harlan Co., Nebr., State highway bridge ER-S-14-1 to Pittsburgh Des Moines Co., Des Moines, Ia.

200 Tons, Camp Douglas, Wis., vehicle storage building to Milwaukee Bridge Co., Milwaukee.

200 Tons, Williston Park, L. I., N. Y., St. Aiden's Parochial School to Grand Iron Works, N. Y.

200 Tons, Jackson Heights, N. Y., Our Lady of the Rosary of Fatima School to Grand Iron Works, N. Y.

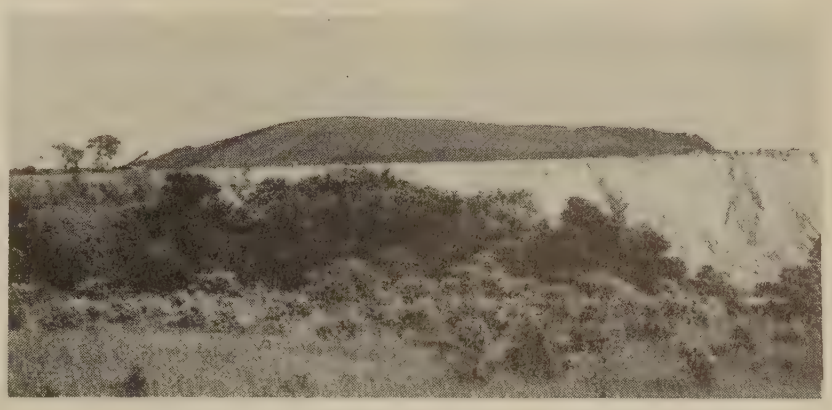
200 Tons, Cambria Heights, L. I., N. Y., Sacred Heart Parochial School to Grand Iron Works, N. Y.

180 Tons, Warren Co., Ia., State highway bridge ER-F-4-12 to Pittsburgh Des Moines Steel Co., Des Moines, Ia.

175 Tons, White Co., Ill., State highway bridge Section 1F to Milwaukee Bridge Co., Milwaukee.

140 Tons, Bermer Co., Ia., State highway

(CONTINUED ON PAGE 124)



Huge Coal Stocks Influence Coal Bargaining Strategy

Pittsburgh

• • • **The air is thick** with coal experts trying to figure out the latest move of John L. Lewis. But it will probably take a little time for the pattern to unfold.

One thing is sure. A coal shutdown cannot now be blown up to a national crisis. Mr. Lewis knows this.

Steel companies can outlive a 2-month coal strike and not be too bad off. This is cinched by the continuous drop in steel output. The pictures above and below show some of the extra stocks of coal and coke built up by U. S. Steel. They have 70 days' coal supply on the ground at current output. Their plants could operate at a high rate for 45 days before they would have to seriously cut back.

If the steel rate keeps sliding U. S. Steel's coal pile and that of other firms will last that much longer. If there is no agreement between Harry Moses, U. S. Steel's coal negotiator, and John L. Lewis, the corporation's captive mines will be down on July 12. Their 60-days' notice runs out then.

If the coal shutdown lasts a couple of months the picture will be nip and tuck. Mr. Lewis will then have succeeded in cutting down the stocks which have sterilized his bargaining power.

There is a chance that the mines will not close down on July 5 because there is no contract. Mr. Lewis could shut down the Southern mines then. He could conceivably let the Northern mines run for 60 days. This would put pressure on the Southern mines. It would keep the country from facing a crisis.

If after a 60-day run in the North the Southern mines did not buckle down to a contract, Mr. Lewis could pull out the Northern mines.

If the Southern mines would sign up, that could be used as a lever with the Northern operators. All this is conjecture. If Mr. Lewis were to shut down all the mines in the country on July 5 when the vacation ends he might have a battle with President Truman. The last time that happened Mr. Lewis lost. He may take the long way around to gain all ends. After all he is a mastermind on coal labor strategy.

Construction Expenditures Up But Employment Off

Washington

• • • **With construction** expenditures for May running 3 pct ahead of last year, construction employment was 2 pct or 42,000 less than a year previous although the industry employees had passed the 2,000,000 mark.

For the first time in almost 4 years, contract construction employment has failed to exceed that of the same month a year before. Most of the employment decline has taken in the Pacific states.

About 105,000 workers have been added to construction pay rolls since the seasonal low point in January.

Alters Bar Sales Setup

Pittsburgh

• • • **U. S. Steel Supply Co.** has entered the concrete reinforcing bar fabricating business in Pittsburgh, Boston, Cleveland, Chicago and St. Paul, K. P. Rindfleisch, district manager of U. S. Steel's warehousing subsidiary, announced recently. William L. Donovan, a former Carnegie-Illinois concrete bar man, has been named sales engineer in the Pittsburgh district.

The company has secured the services of most of the personnel and acquired all the fabricating equipment of the concrete bar division formerly operated by Carnegie-Illinois Steel Corp., in Pittsburgh and Chicago, and will begin operating the new Pittsburgh division in its own plant about July 1.

REA Approves Loans For Michigan Cooperatives

Washington

• • • **Loans totaling** nearly $6.5 million to four Michigan power cooperatives for expansion purposes have been approved by the Rural Electrification Administration.

The groups were the new Wolverine Electric Cooperative of Newaygo and the established Tri-County, O & A, and Oceana Electric Cooperatives which the Wolverine will supply.

In addition to building more than 400 miles of transmission and distribution lines, the Wolverine co-op plans to install four 2500-kw dual fuel units, one 600-kw dual fuel unit, and one 1100-kw diesel unit.

Darwin Wolcott Retires

Coatesville, Pa.

• • • **Darwin S. Wolcott,** vice president of Lukens Steel Co., Coatesville, will retire from the company on July 9. He has been with the company 24 years.

He joined Lukens in 1925, as assistant to the president. On Jan. 10, 1928, he was elected a vice-president, in which position he has continued to the present. His activities have included administrative and sales work, with particular attention to development of the company's foreign conversion and clad steels.

Before joining Lukens, Mr. Wolcott had been associated with Crucible Steel Co. in various sales capacities, eventually serving as manager of export sales in the New York office of the firm.

WAA Approves Extension Western Electric Lease

Washington

• • • **The War Assets** Administration has approved extension of an existing lease by the Western Electric Co., Inc., N. Y., of a surplus war plant in Burlington, N. C.

During World War II the plant manufactured antiaircraft fire control systems and airborne radio equipment for the Navy. Western Electric has been operating the plant under lease since Mar. 15, 1946 for the manufacture of electronic equipment.

The extension is for an additional period of 5 years from Mar. 15, 1951 at an annual rental of $139,355.18—payable quarterly in advance—for both the real property and equipment.

The land and buildings originally cost the government $2,051,781 and the equipment $16,133.

The extended lease is subject to the National Security clause and will be reviewed by the Dept. of Justice in the light of antitrust laws.

Retired Workers Honored at Gleason Works

Rochester, N. Y.

• • • **The elder statesmen** of the Gleason Works had their day here recently. On a Saturday evening in June about 500 Gleason workers honored 40 of their retired workers with a dinner. Top billing was Henry L. Lampman who had been with Gleason for 39 years and 3 months.

Mr. Lampman, who retired on June 3 this year, had been gear sales manager for the company. He and 39 other men who represented all retired employees with 25 or more years of service were the guests of the company.

The real story of the evening was that these 40 men had worked a total of 1232.57 years with the Gleason works. The photo shows Mr. E. Blakeney

Gleason (left), president of the firm, giving Mr. Lampman an engraved gold watch, a chain and a knife.

Trading Program Helped Lyon Metal Obtain Steel During Allocation Period

Aurora, Ill.

• • • **The easing** of the steel shortage ended one of the most unusual and effective trading eras in industry. A good example is Lyon Metal, Inc., which makes a wide range of sheet steel products here. Lyon has revealed the results of its novel trading program which began more than 2 years ago and has recently ended.

The amount of steel which the company received on the basis of 1946 allocation schedules dwindled rapidly as the mills cut back in order to handle government "must" programs. Then Eastern mills, upon whom Lyon depended for about 15 pct of its prewar sheets, discontinued all shipments to Midwestern customers.

It was apparent that the severe shortage of its basic raw material would force Lyon to curtail production drastically. It would mean a shorter work week, plus laying off many employees. This prompted numerous "what-to-do" meetings. A "horsetrading" idea came out of these sessions. The idea wasn't involved or complicated. The entire program revolved around the proposition, "You Furnish the Steel—Lyon Will Make the Product."

The company's salesmen preached the idea to their customers and prospects. Lyon dealers were briefed in special meetings. Advertising in business and trade publications hammered away on this theme. It wasn't easy to sell but it got results. Here are some of them:

During the entire drive 45 million lb of customer-furnished steel was secured. More than 17 million lb was secured in 1947, close to that amount in 1948. This additional tonnage enabled Lyon to make 31.48 pct more net shipments in 1947, 29.7 pct more in 1948. It also provided a full year's employment for 322 workers in 1947 who otherwise would have been off the payroll. It did the same for 308 workers in 1948. Most salient to the company is this: customer-furnished steel accounted for 54 pct of the Lyon net profit in 1947, 52 pct in 1948.

Where this customer-furnished steel came from is an interesting story. In Los Angeles, for example, a dealer had a friend who had a friend in Detroit who produced 80,000 lb of steel. The president of a school board found a board member who could produce 40 tons for locker requirements. Dealers in Kansas City got steel from scattered points—Philadelphia, Houston, Denver and Minneapolis.

A Catholic school priest got 22,400 lb by working on his parishioners. The school needed lockers. A paint spraying company came through with 314,000 lb for much-needed steel shelving.

Layoffs Keep Foremen Busy

Chicago

• • • **Foremen** in manufacturing plants in this area are so busy training long-time employees that they have little time left for the rest of their supervisory duties. Because of layoffs in all types of plants, and because of union seniority rules, workers are constantly changing jobs or switching from one type of machine to another. This system is mandatory in view of union seniority rules and is one of the hidden evils of the system which is just beginning to be recognized.

50 YEARS AGO

THE IRON AGE, *June 22, 1899*

• "Owing to the great scarcity of all kinds of labor in the Pittsburgh district, the Carnegie Steel Co., Ltd., have been compelled recently to secure about 100 machinists in Philadelphia to work on the improvements and additions under way at the Homestead Steel Works."

• **"The Valley furnacemen are holding a meeting in Cleveland today (Wednesday), when it is not unlikely they will fix the price of Bessemer Pig at $20 for the second half."**

• "The estimates made last week in this correspondence that June shipments out of the Upper Lake Region would be fully 3 million tons of iron ore are likely to be exceeded somewhat by results surprising as that may seem."

• **"The present methods of transporting bullion across the ocean may be revolutionized by a device known as the Anderson safe float now building at the Crescent Ship Yards, Elizabethport, N. J."**

• "The Defiance Machine Works of Defiance, Ohio, inventors and builders of carriage and wheel machinery for 48 yr, make complete equipment in hub, spoke, wheel, bending, wagon, carriage, shaft, pole, neck-yoke, singletree, barrel hoop and handle machinery."

• **"Studebaker Bros. Mfg. Co., South Bend, Ind., are reported to have closed contracts for the construction of about $1 million worth of automobiles."**

• "A comparison made in the Street Railway Journal of wooden and iron poles, give the life of iron poles as 33 yr and the average life of wooden poles, of chestnut, hard pine or cedar, as 11 yr."

• **"The use of carbide of silicon in the manufacture of steel was first proposed in 1893, but its high cost of manufacture prevented any extensive experiments being made toward its introduction."**

There's a
MILFORD
DUPLEX
HACK SAW BLADE
for every hand-cutting need!
MILFORD FLEXIBLE REZISTOR 12" SHATTER-PROOF - HIGH SPEED STEEL 18T
EASY STARTING TEETH
THE ONLY HAND HACK SAW BLADES WITH EASY STARTING TEETH
to give you these advantages
● Starts cut at any angle
● Teeth will not catch on ridges
● No scraping to begin cut
● Materially reduces cutting time
● Will not slip off cutting line
● Wear distributed full length of blade
No matter what you need to cut . . . or how . . . or where . . . you'll find that MILFORD'S know-how . . . accumulated in over 70 successful years of exclusive saw manufacturing experience . . . has produced the right blade for the job . . .
Flexible Standard Steel . . . . Green Label
All-Hard Standard Steel . . . . Yellow Label
Safety Standard Steel . . . . . Brown Label
All-Hard Rezistor . . . . . Orange Label
Flexible Rezistor . . . . . Silver Label
Tungsten High Speed Steel . . . . Red Label
Order from your Industrial Distributor. He is always ready to serve your needs for all industrial supplies, including MILFORD hack saw and band saw blades.
Remember
IT ALWAYS PAYS TO SPECIFY MILFORD!
MILFORD
PROFILE AND BAND SAW BLADES
REZISTOR AND DUPLEX HACK SAW BLADES
THE HENRY G. THOMPSON & SON CO.
Saw Specialists Exclusively for over 70 Years
NEW HAVEN 5, CONNECTICUT, U. S. A.

(CONTINUED FROM PAGE 121)

bridge Section F-942-1 to Clinton Bridge Co., Clinton, Ia.

155 Tons, Hamilton Co., Ia., State highway bridge Section F-67-9 to Pittsburgh Des Moines Steel Co., Des Moines, Ia.

125 Tons, Madison, Wis., Truax airport hangar to International Steel Co., Evansville, Ind.

• • • **Fabricated steel inquiries** this week included the following:

3000 Tons, Brielle-Pt. Pleasant, N. J., bridge over Manasquan River, due June 30.

2100 Tons, Chester-Lancaster Co., Pa., bridges for Pennsylvania Turnpike Commission due July 6.

1000 Tons, Seabright, N. J., bascule and approach spans, N. J. Dept. of Highways, due July 7.

800 Tons, Lancaster, Pa., Lancaster general hospital building, due June 28.

670 Tons, Loveland, Colo., U. S. Bureau of Reclamation spec. 2647 substructure.

600 Tons, Kansas City, Kans., Colgate-Palmolive-Peat building.

500 Tons, Trenton, N. J., Navy aeronautical laboratory, due June 30.

315 Tons, Middletown, Conn., 2-span welded girder bridge over New Haven R.R. and Union St. on Middletown Expressway.

300 Tons, Loveland, Colo., U. S. Bureau of Reclamation spec. 2646 substructure.

132 Tons, Lane Co., Ore., McKenzie River Bridge, Box Canyon Road, Public Roads Administration, Portland, bids to June 23.

125 Tons, Boston, isolation unit, Children's Hospital, Longwood Ave. through Stone & Webster and Vara Construction Co., Boston.

• • • **Reinforcing bar awards** this week included the following:

525 Tons, Pawtucket and East Providence, R. I., Blackstone Valley interceptor sewer through Gil Wyner Co., Inc., contractors, Malden, Mass., to Truscon Steel Co., South Boston, Mass.

260 Tons, Blue Island, Ill., Community high school building to James Duffy Construction Co., Chicago.

175 Tons, Newburyport Turnpike, 2 bridges through Central Construction Co., Lawrence, Mass., to Truscon Steel Co., South Boston, Mass.

170 Tons, Ardmore, Pa., cafeteria building, F. V. Warren, contractor, to Taylor-Davis, Inc., Philadelphia.

150 Tons, Dauphin Co., Pa., Turnpike Commission, Section 23A-1, to John Wickersham, Lancaster, Pa.

135 Tons, Jefferson, Wis., Courthouse through Peter Hamlin Co., Chicago, to Dean Steel Co.

125 Tons, Chicago, Cook Co., nurses home to E. H. Marhoefer Co., Chicago.

• • • **Reinforcing bar inquiries** this week included the following:

665 Tons, Pittsburgh, William Penn Place Corp. building.

460 Tons, Middletown, Conn., 2-span welded girder bridge over New Haven R.R. and Union St. on Middletown Expressway.

400 Tons, Wilmington, Del., store for John Wanamaker & Co., due June 23.

315 Tons, Baker, Ore., grade separation, Baker-Unity Highway, Oregon, State Highway Commission, Portland, bids to June 28.

250 Tons, Lancaster, Pa., Lancaster General Hospital, due June 29.

250 Tons, Hastings, Minn., substructure for highway bridge.

125 Tons, Janesville, Wis., Rock Co. Jail.

120 Tons, Ashland, Ky., flood wall.

100 Tons, Ashtabula, Ohio, hospital building.

100 Tons, Chicago, addition to sintering plant of South Chicago works for Carnegie Illinois Steel Corp.

• • • **Railroad car awards and inquiries** this week included the following:

The C. & E. I. Railroad has bought 10 1500 HP diesel electric locomotives and 4 1000 HP road switchers from Electro Motive Div. of GMC for delivery early in 1950. The Union Pacific and C. & E. I. Railroad will reinstate their car repair programs that have been held up, this fall. The Great Northern Railroad has ordered 18 coaches from Pullman Standard Car Mfg. Co.

YOU MAY BE JUST 25 MINUTES FROM A FASTENING IDEA WORTH *Thousands of Dollars*

YES, hundreds of fastening ideas that can lead to outstanding savings in assembly costs are contained in the Tinnerman Handbook of Fastenings. It has been created especially for designers, engineers, production and management executives. Takes only 25 minutes to review . . . 25 minutes you may find very worthwhile! *Here's a partial list of contents:*

Page after page of parts drawings and detailed photographs of actual applications classified by type . . . significant case histories on SPEED NUT savings . . . and details on the Tinnerman Fastening Analysis Service.

It contains all the data about the amazing SPEED NUT brand of fasteners that are helping a top-ranking car manufacturer save an estimated 3 million dollars this year . . . that cut assembly time 30% for another company . . . that saved $50,000 in equipment investment for still another.

If you're interested in seeing this guidebook of fastenings, call your Tinnerman representative—listed in major city phone directories—or write: TINNERMAN PRODUCTS, INC., 2040 Fulton Rd., Cleveland 13, O.

In Canada: Dominion Fasteners Limited, Hamilton • *In England:* Simmonds Aerocessories, Ltd., Treforest • *In France:* Aerocessoires Simmonds, S. A. Paris

The Handbook of Fastening is designed for convenient desk-top reviewing. Complete Index is for quick reference to specific applications for your product.

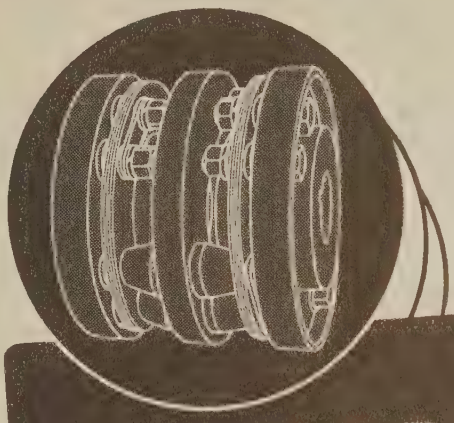
TINNERMAN *Speed Nuts*

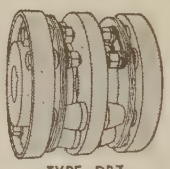
*Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

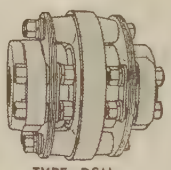
THOMAS *Flexible* COUPLINGS

....are specified by engineers, wherever 100% Operating Efficiency is demanded

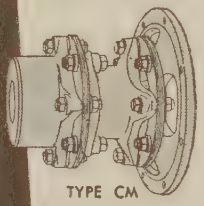




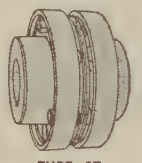
TYPE DBZ



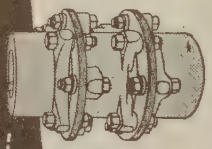
TYPE DSM



TYPE CM



TYPE ST

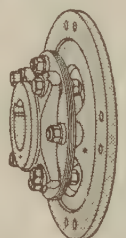


TYPE AM

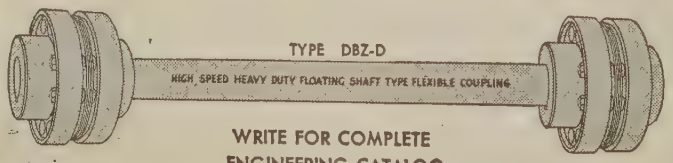
THOMAS *Flexible* COUPLINGS provide for Angular and Parallel Misalignment as well as Free End Float . . . *and Eliminate* BACKLASH, FRICTION, WEAR and CROSS-PULL

NO LUBRICATION IS REQUIRED!

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.



TYPE SS



TYPE DBZ-D

HIGH SPEED HEAVY DUTY FLOATING SHAFT TYPE FLEXIBLE COUPLING

WRITE FOR COMPLETE ENGINEERING CATALOG

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA

English Drop Forging Team Here to Study American Methods

New York

• • • **The third** English productivity team arrived here last week to study American methods of producing steel forgings.

Lee W. Minton welcomed the team on behalf of Committee "A" of the Anglo-American Council on Productivity, Industry and Labor. Mr. Minton said the team should become acquainted with the American way of life; well acquainted with our systems and production techniques.

The team was told that the American economy was built on bitter competition. Competition, not only among different manufacturers, but also among the workers. Cooperation between management and labor should be observed. The two, always working in a team for the benefit of all.

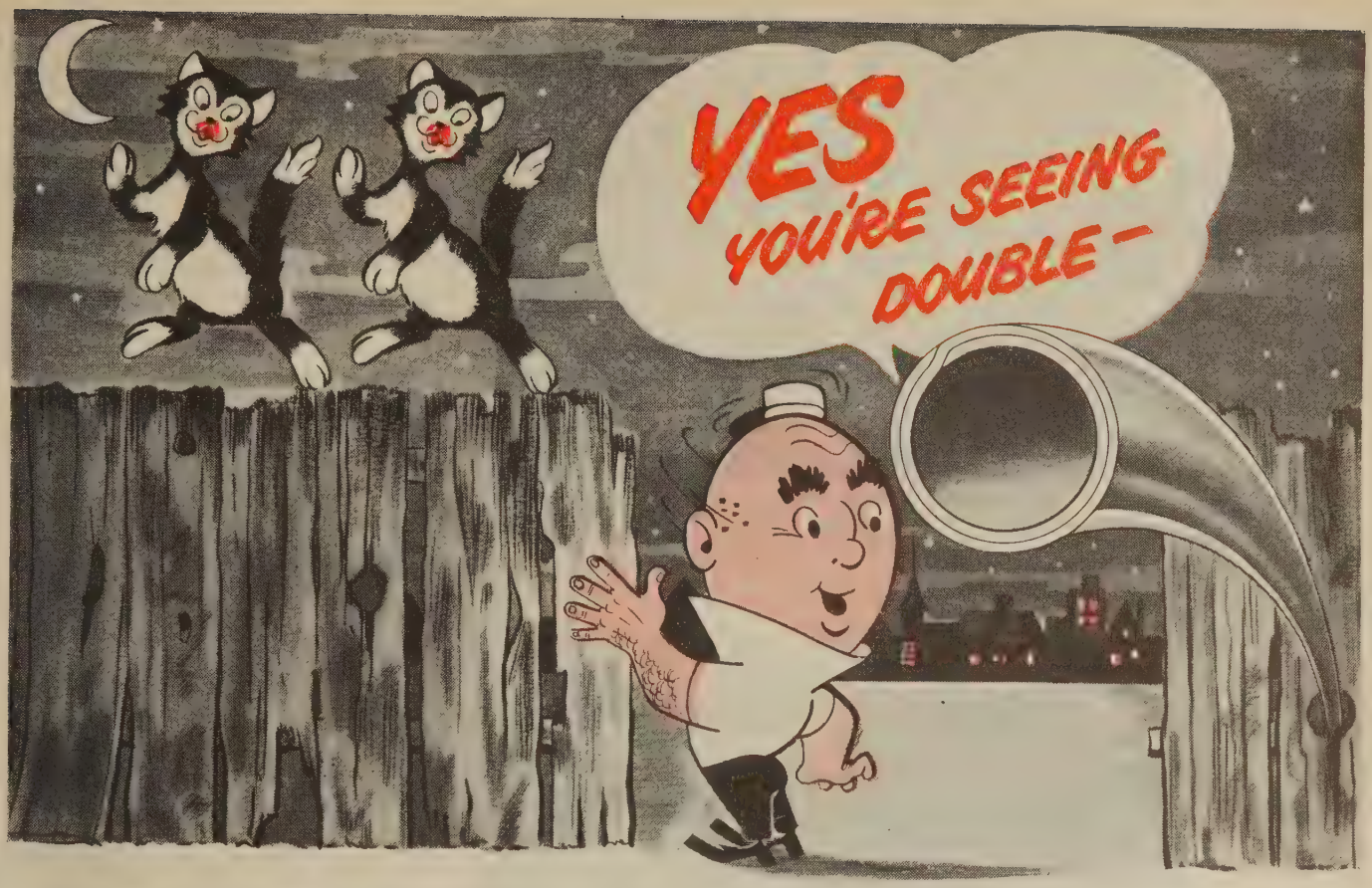
According to Hugh A. Wallace, of the drop forgers' team, they are here to look for a different point of view. To find how the application of American methods and techniques can increase the productivity of the English drop-forging industry. However, the main task of the team is to spread what has been learned and seen.

•

Washington

• • • **Britain's 16-man group,** arriving in the United States last week to study drop forging production, will meet with leaders of industry and labor in Chicago on June 27-28. They will confer with Economic Cooperation Administration officials here on July 7.

In the meantime, the group has a tentative schedule arranged calling for visits to Walkerville, Canada; to General Motors in Lansing; to Ford and General Motors in Detroit; and to Wyman-Gordon (Ingalls-Shepard Div.) in Harvey, Ill.; American Brake Shoe & Foundry (American Forge Div.) in Chicago; Cornell Forge Co. in Chicago; J. H. Williams Co. in Buffalo; Alliance Drop Forging Co. in Alliance; Harrisburg Steel Co. in Harrisburg; Moore Drop Forging Co. in Springfield, Mass.; and the Wyman-Gordon Co. plants in Worcester, Mass.



—and so are thousands of other designers!

You're seeing the *double*-duty, *doubly* useful, *doubly* strong, *double-walled* Bundyweld* nickel and Monel tubing.

It's worth looking at twice! It's double-walled *from a single strip of nickel or Monel!*

Where can you use a tubing of amazing rust resistance and unbelievable strength? Bundyweld nickel and Monel are being specified for a wider and wider range of uses *—by more and more designers all the time!*

Did you say, "Such as?"

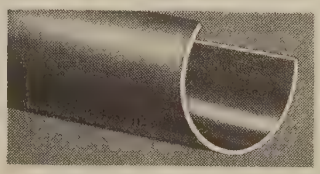
Such as fishing-rod tips of Monel: strong and *rustproof.* And nickel and Monel tubing parts in steam irons—to carry steam without sediment or stain. And nickel beer coils of *continuous* lengths up to *one hundred feet*—sanitary, thin-walled and fast-cooling, rigid.

What else can it do? You designers are *telling us* of uses we never thought of! Where can Bundyweld nickel or Monel tubing go to work for you?

The patented Bundyweld construction makes it stronger, pressure-proof and easy to fabricate. These advantages and the features of Monel and nickel are combined for you in Bundyweld nickel and Monel tubing.

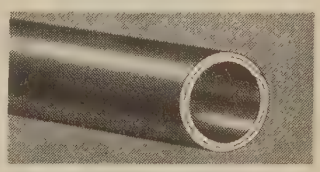
Want some help in working out an idea? Or more information about Bundyweld nickel and Monel? Send for booklet or contact one of the distributors below. *Bundy Tubing Co., Detroit 14, Michigan.*

WHY BUNDYWELD IS BETTER TUBING



1 Bundyweld Tubing, made by a patented process, is entirely different from any other tubing. It starts as a single strip of basic metal, coated with a bonding metal.

2 This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.



3 Next, a heating process fuses bonding metal to basic metal. Cooled, the double walls have become a strong ductile tube, free from scale, held to close dimensions.

4 Bundyweld comes in standard sizes, up to ⅝" O.D., in steel (copper or tin coated), Monel or nickel. For tubing of other sizes or metals, call or write Bundy.

BUNDY TUBING

★ ★ ENGINEERED TO YOUR EXPECTATIONS ★ ★

*REG. U. S. PAT. OFF. ®

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES—BUNDYWELD NICKEL AND MONEL TUBING:

ALLOY METAL SALES, LTD.
TORONTO 5, CANADA, 881 BAY ST.

EAGLE METALS CO.
SEATTLE 4, 3628 E. MARGINAL WAY
PORTLAND 5, ORE., 307 NEW FLIEDNER BLDG.

METAL GOODS CORP.
DALLAS 9, 6211 CEDAR SPRINGS ROAD
HOUSTON 1, 16 DRENNAN
NEW ORLEANS 13, 432-438 JULIA ST.
TULSA 3, 302 N. BOSTON ST.

PACIFIC METALS CO., LTD.
LOS ANGELES 21, 1400 S. ALAMEDA ST.
SAN FRANCISCO 10, 3100 19TH ST.

STEEL SALES CORP.
CHICAGO 23, 3348 S. PULASKI ROAD
DETROIT 10, 5151 WESSON AVE.
INDIANAPOLIS 2, 1916 N. MERIDIAN STREET
MILWAUKEE 4, 647 W. VIRGINIA ST.
MINNEAPOLIS 15, 529 S. SEVENTH ST.
ST. LOUIS 10, 4565 MCREE AVE.

J. M. TULL METAL & SUPPLY CO.
ATLANTA 3, 265 MARIETTA ST.

WILLIAMS & CO., INC.
CINCINNATI 14, 1921-1927 DUNLAP ST.
CLEVELAND 14, 3700-3716 PERKINS AVE.
COLUMBUS 15, 31 N. GRANT AVE.
PITTSBURGH 12, 901-937 PENNSYLVANIA AVE., N. S.
TOLEDO 2, 650 E. WOODRUFF AVE.

WHITEHEAD METAL PROD. CO., INC.
BALTIMORE 17, 413 W. NORTH AVE.
BOSTON 39, 281 ALBANY ST., CAMBRIDGE, MASS.
BUFFALO 2, 254 COURT ST.
NEWARK 5, 205 FRELINGHUYSEN AVE.
NEW YORK 14, 303 W. TENTH ST.
PHILADELPHIA 40, 1955-75 HUNTING PARK AVE.
SYRACUSE 3, 205 BURT STREET

NICKELOID METALS (Pre-Plated)

MORE BEAUTIFUL, in a variety of rich, lustrous finishes and patterns for decorative and structural uses. Can be stamped, formed, drawn, bent, riveted, soldered, spot welded.

FASTER and MORE ECONOMICAL because plating, polishing or other finishing is not required either before or after fabrication. You simply fabricate to form a finished product.

BOTH A MATERIAL AND A METHOD!

NICKELOID *pre-finished* METALS provide two important advantages: First, *lower costs* through production short-cuts; second, *increased sales* through the appeal of durable, lustrous, eye-catching finishes. Nickeloid Metals are *"finished"* raw materials, available in sheets or coils in a wide range of gauges and tempers, finishes of Chromium, Nickel, Copper, Brass, Tints or Gold Bond, plated to such base metals as Zinc, Steel, Copper, Brass or Aluminum.

NICKELOID METALS (Pre-Plated)

NICKEL · CHROMIUM · BRASS · COPPER
Electro-plated TO ALL COMMON *Base* METALS
ALSO LACQUERED COLORS
SHEETS AND COILS

OLDEST AND LARGEST PRODUCERS OF PRE-PLATED METALS

WRITE for new brochures covering properties, applications and fabrication techniques for Nickeloid *pre-plated* Metals.

AMERICAN NICKELOID COMPANY
PERU 2, ILLINOIS

U. S. Steel and USWA Tangle Over Pensions In Talks at Pittsburgh

Pittsburgh

• • • **Contract talks** between U. S. Steel Corp. and the United Steelworkers of America, CIO, were resumed on Monday of this week after a sudden postponement following a sharp disagreement on pensions. The talks directly affect some 170,000 workers in U. S. Steel plants and generally set the pattern for 825,000 others in the steelworkers' union. Legally, 706,000 steelworkers can strike on July 16.

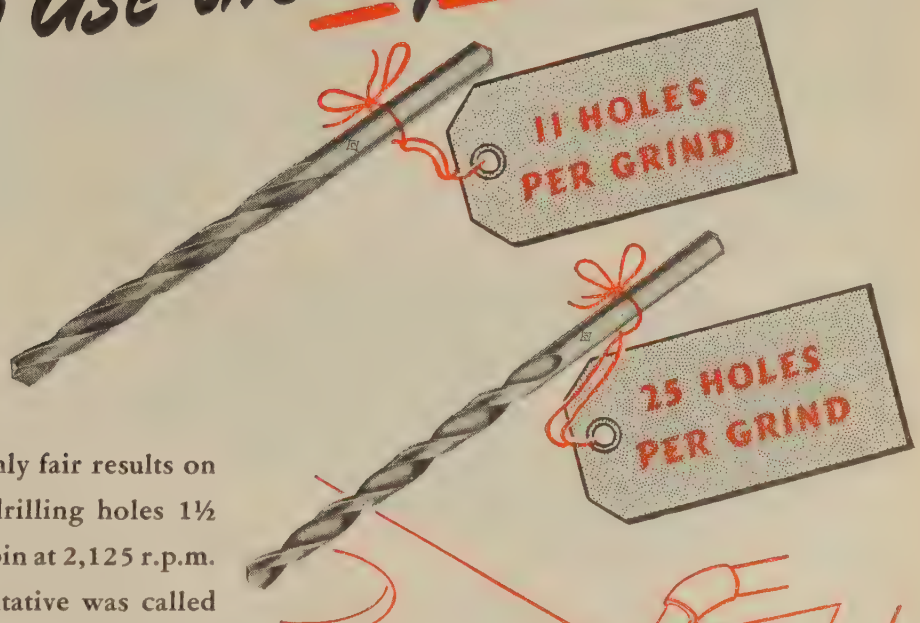
The company maintains that according to the contract, pensions are not a subject for bargaining at this time. "The issue," said U. S. Steel's industrial relations vice-president John A. Stephens, "is solely whether a labor contract means what it says. . . . These contracts are reopenable at this time only with respect to rates of pay and insurance benefits. . . . They cannot be reopened to permit the union to make a pension demand."

The union, replying that pensions are a form of wages and therefore a proper subject for negotiations, handed the steel company a 2000-word legal brief to support its claim. Its president, Philip Murray, asserted that "U. S. Steel Corp. is morally, legally and contractually obligated to bargain with the USWA on pensions. . . . It is incredible that this great corporation should quibble and engage itself and the conference with legal sophistry on this issue." He took sharp issue with Mr. Stephens on the matter. "They'll bargain with us on pensions before this thing is over," he snapped.

The union's brief was handed to the company on Thursday but on Friday a scheduled session was suddenly called off, apparently to give steel company officials more time to prepare their rebuttal. On Monday of this week the sessions resumed with more arguments on the pension issue.

The union based its stand on the Inland Steel Co. case, where the U. S. Supreme Court agreed that failure to bargain on pensions was

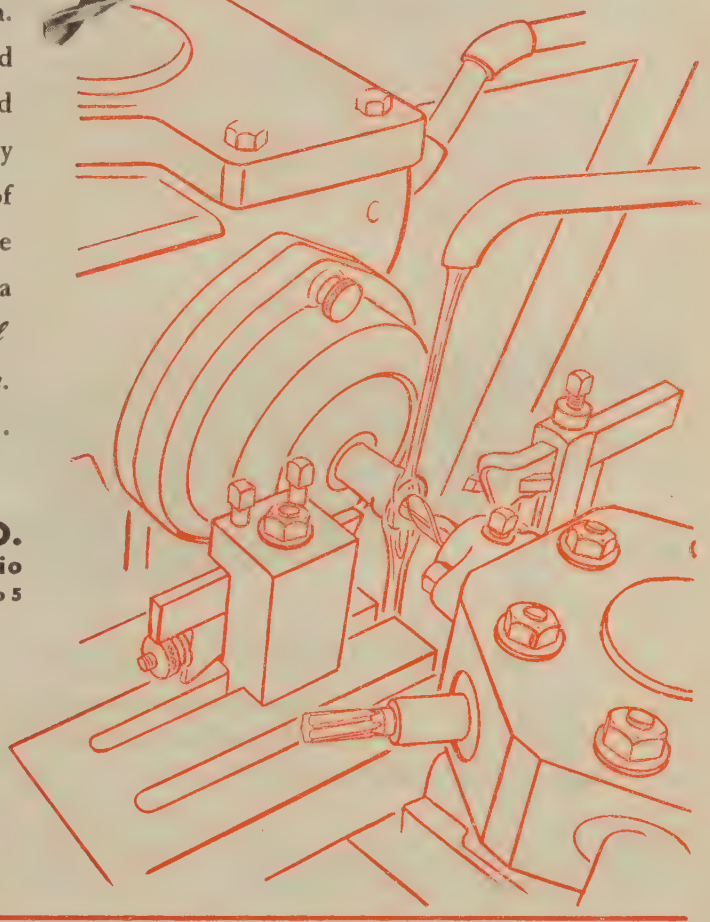
It Pays to Use the Right Drill



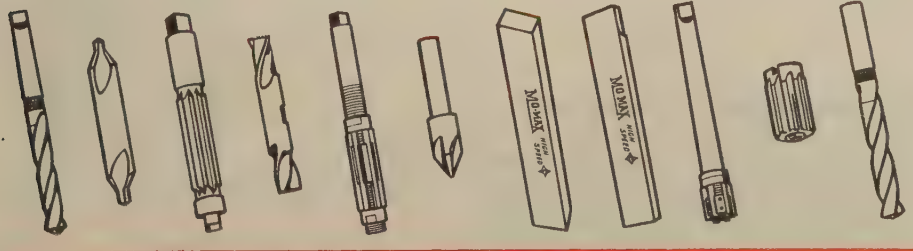
A midwestern plant was getting only fair results on a difficult machining operation—drilling holes 1½ inches deep in a stainless steel link pin at 2,125 r.p.m. A *Cleveland* Service Representative was called in. He studied the job carefully, and recommended a CLE-FORGE High Speed Drill that was especially designed for this type of work. Result: Number of holes per grind was *more than doubled.* Both were stock drills; both priced the same. But what a difference in performance! Perhaps a *Cleveland* Service Representative can be equally helpful to *you.* Get in touch with our nearest Stockroom, or . . .

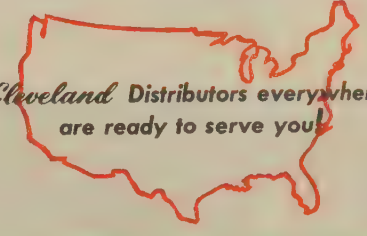
Telephone Your Industrial Supply Distributor.

THE CLEVELAND TWIST DRILL CO.
1242 East 49th Street Cleveland 14, Ohio
***Stockrooms:* New York 7 • Detroit 2 • Chicago 6 • Dallas 1 • San Francisco 5**
Los Angeles 11 • London W. 3, England



ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER CLEVELAND TOOLS



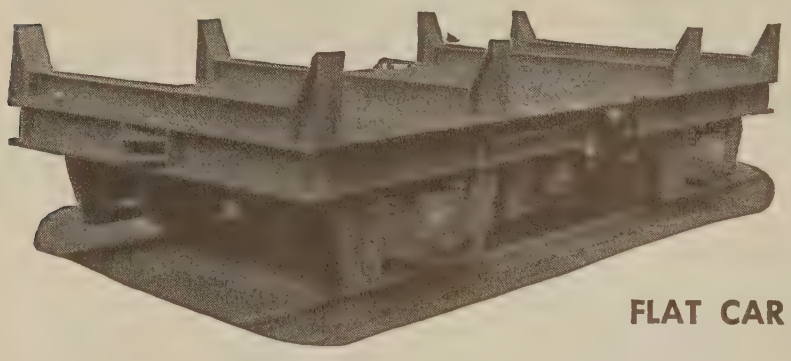


ATLAS

INTRA-PLANT HAULAGE EQUIPMENT

SPEEDS PRODUCTION
LOWERS COSTS

40 TON

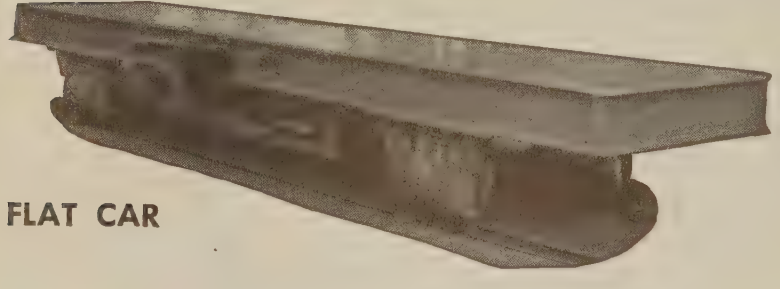


FLAT CAR

STORAGE BATTERY POWERED

Car equipped with triple reduction drive to one axle. Magnetic brake on motor armature shaft and controller arranged to return to "off" position automatically. Car also arranged to haul a similar trailer on level track.

20 TON



FLAT CAR

STORAGE BATTERY POWERED

This car has triple reduction spur gear drive and travels at walking speed when controller is held in operating position. When control handle is released, car stops automatically.

ATLAS builds intra-plant haulage equipment designed and engineered to your needs.

ATLAS ENGINEERING SERVICE
ALWAYS AT YOUR SERVICE

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

an unfair labor practice. Theoretically, if the union could prove its point, and its officials signed non-communist affidavits, its members could collect pay while on strike.

Meanwhile there was no reason to believe that the issues upon which U. S. Steel had originally agreed to bargain—wages and social insurance—would be settled quickly. On the second day of negotiations Mr. Stephens reiterated the company view that higher wages or other increased costs such as insurance would hurt efforts to reverse the current downtrend in business and employment. But, said he, the contract requires the company to bargain on these two subjects and it will do so.

Research May Increase Trapped Oil Reserves

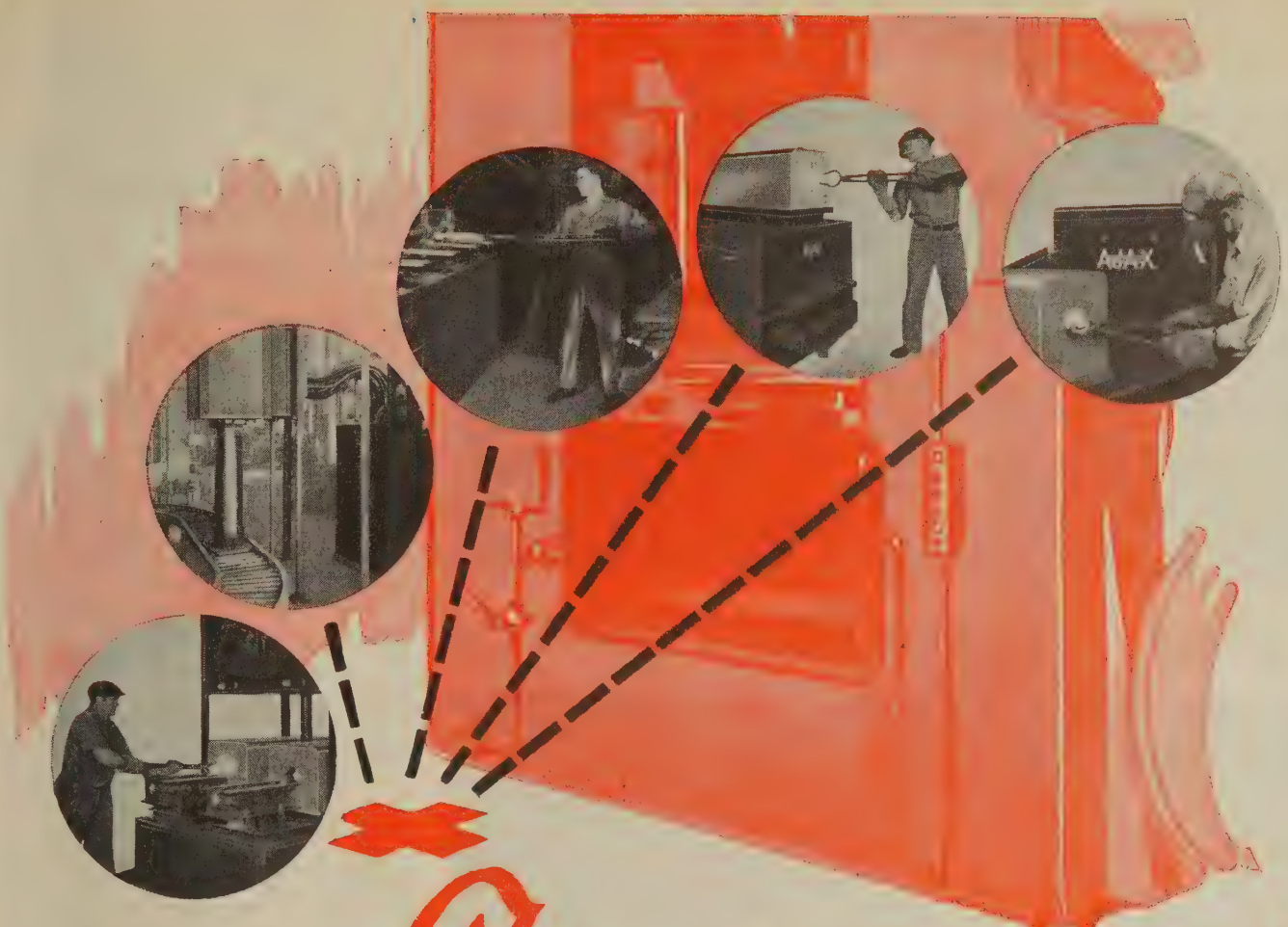
Chicago

• • • **Armour Research** Foundation of Illinois Institute of Technology is working on a project for Penn Grade Crude Oil Assn. to find a practical method of obtaining large reserves of oil trapped in the porous sandstone fields of northeastern Pennsylvania. It is estimated that about 700 million barrels, representing more than $3 billion, awaits secondary recovery in the Bradford, Pa., field alone.

Dr. John E. Barkley, supervisor of physical chemistry at Armour, said that only about 30 pct of the oil in any pool is obtained in original pumping. About 70 pct remains in the pores of the stone in which it is trapped. Some of the trapped oil is recovered by pumping water into the ground and forcing the oil out and this common method of secondary recovery may bring up as much as another 30 pct of the pool, or it may bring up nothing depending upon the nature of the formation.

Ordinarily 40 to 70 pct of the oil remains in the ground and is held there in the pores of the rock by capillary action.

Laboratory tests at Armour indicate that there are ways of bringing up more oil but the cost of the operation is prohibitive now because of the oil price.



SCALE-FREE *Forging Heat* RIGHT AT YOUR ELBOW

Put Ajax-Northrup forging heaters right beside *your* forging machines and you'll find the same lower overall costs reported by other users of this clean, fast heat! Heats in seconds—no time for scale to form. You can often start with smaller blanks, save tons of steel. 20% saved in one Michigan forge shop!

Die life is longer—scale wear is eliminated, and automatic timing prevents overheated dies. You get greater accuracy, too. In one case, a part weighing 2½ lbs. is held within 2 oz. tolerance on a *forging press.*

Power costs are OK, too—in line with other fuels. Ajax-Northrup can supply efficient forging heaters for practically any heating job.

Think of the savings in steel, time, rejects, and better quality that are possible in your plant with Ajax-Northrup forging heat, then tell us your problem, or write for Bulletin 13.

AJAX ELECTROTHERMIC CORPORATION • Ajax Park • TRENTON 5, N. J.

SINCE 1916

120

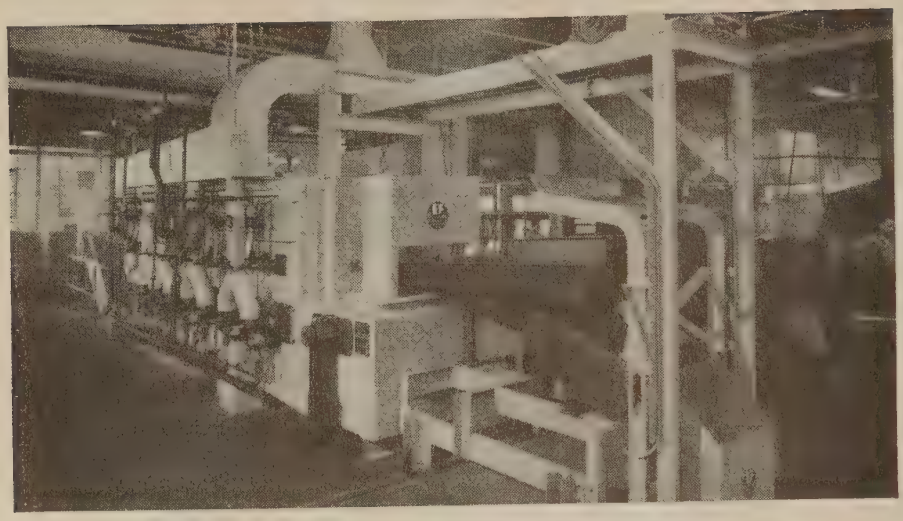
AJAX NORTHRUP

HEATING & MELTING

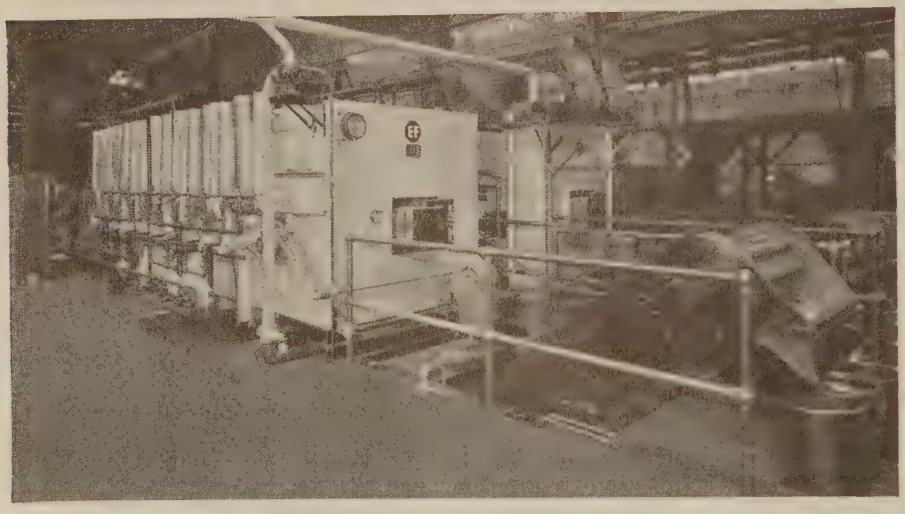
Associate Companies

THE AJAX METAL COMPANY • AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC. • AJAX ENGINEERING CORPORATION

LOW COST



HEAT TREATMENT OF SMALL



AND MEDIUM SIZE PARTS

● The EF chain belt conveyor furnace — with its specially designed heat resistant cast link conveyor belt — is one of the most satisfactory continuous heat treating units yet devised for the scale-free hardening, carbon restoration and non-decarb heat treatment of bolts, chains, gears, pinions, rivets, tools, tractor treads and a wide variety of other forged, drawn, stamped, machine and headed pieces.

Built in 11 standard sizes with capacities up to 2,000 lbs. per hour. Larger sizes to meet any requirement. Gas-fired, oil-fired or electrically heated, whichever best suits your particular requirement — and location. Estimates of equipment, installation and operating costs — and samples of heat treated parts furnished promptly. Write for literature.

EF

THE ELECTRIC FURNACE CO.

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem - Ohio

(CONTINUED FROM PAGE 108)

tries there was a positive decline.

Perhaps the largest single internal contribution to recovery was made by agriculture. Here total production in 1948 was back to its prewar dimensions. Not all the components, however, shared equally in this comeback. Wheat was still 9 pct below the prewar average and feeding stuffs were down 20 pct. On the other hand, pork and eggs are now running 15 pct above the prewar rate. Not only did this increase add to the attractiveness of the French table but it also made possible sizable savings in imports of all agricultural produce except feeding stuffs.

THE next section of the report is concerned with an itemized account of investment programs put in hand during the past two years. The greatest obstacle to investment in 1947 is held to be the shortage of materials, particularly steel. Last year such shortages ceased to be a serious handicap and a second difficulty appeared—lack of funds. The report says that in 1948 net public investment was actually 6 pct lower than in 1947. This setback, however, was more than compensated by an expansion in private industry of the order of 25 pct and for the year as a whole it is estimated that gross investment absorbed approximately 20 pct of the national product. This private investment was heavily concentrated on secondary industries, while the state, for its part, directed the bulk of its investments to transportation, electricity, coal and building. The failure of public investment to expand in 1948 was undoubtedly a consequence of the financial crisis of the second half of the year when the Treasury, battling desperately with the threat of runaway inflation, sought to check expenditure at every possible point. Naturally enough, the financial authorities directed much of their economy drive at investment in the nationalized industries where cuts had, in the short run, the minimum of disagreeable effects on the consumer and where results followed decisions instantaneously.

The numerous developments in reequipment and production during 1948, according to the report, had little impact on the country's alarming balance of payments position.

METAL CLEANING News

Profitable Ideas That Work with WHEELABRATOR Airless Blast Cleaning

Galvanizing Without Pickling

The Boston & Lockport Block Co. has found that Wheelabrating tackle block forgings provides the ideal surface for galvanizing. Their Wheelabrator Tumblast (5 cu. ft. capacity) is cleaning 400 lb. loads in 10 to 15 minutes as compared to former pickling time of from 1 to 18 hours. The Wheelabrated parts are being galvanized immediately after leaving the Tumblast with no intermediate treatment whatever.

Fishing for Profits?

This manufacturer found them. The labor cost of hand buffing aluminum fishing rod handles was $8.50 per hundred pieces at the South Bend Bait Co., South Bend, Indiana. With a Wheelabrator Tumblast (1 cu. ft. capacity) a superior finish is obtained on the handles at a labor cost of only 14c per hundred. Seventy-five pieces are Wheelabrated in five minutes.

Cemented Brake Bands

A new development in the automotive industry — cementing linings to brake bands, instead of riveting, is commercially practical because of the uniformly roughened surface obtained by Wheelabrating. The resulting "tooth" provides an ideal surface for locking the cement, band and lining together as a unit.

New Whipped Cream Dispenser

Whipping cream at finger-tip control is obtained with the "Instantwhip" dispenser produced by Aeration Processes, Inc., Columbus, Ohio. To comply with sanitary regulations, both the interior and exterior surfaces of the metal dispenser cans are coated with bakelite. Wheelabrating prior to coating provides a uniformly etched surface to which the coating adheres in a tight bond.

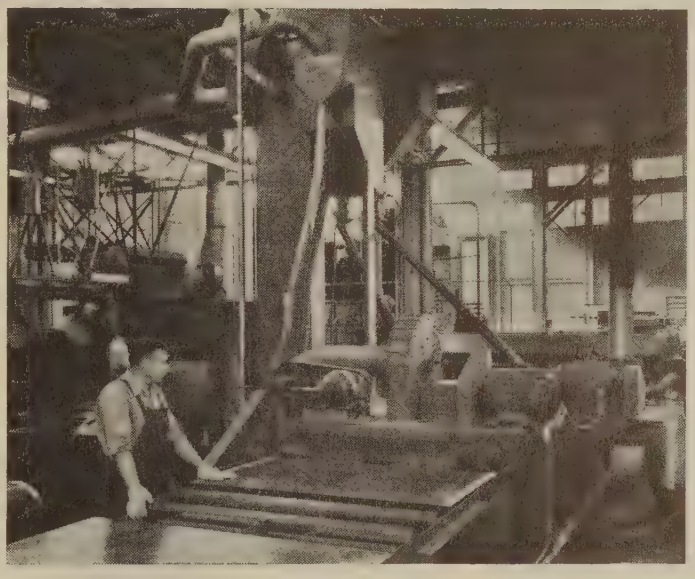
The Wheelabrator ® Method of Airless Blast Cleaning

"Wheelabrating" is a simple mechanical method of abrasive blasting in which abrasive is fed through a control cage to the center of the bladed "Wheelabrator" wheel which rotates at high speed. By centrifugal force the abrasive is thrown from the wheel, under perfect directional control, upon the product being cleaned or finished. For complete information write for Catalog 74-A.

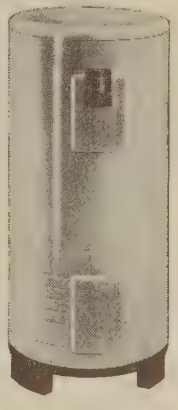
Eliminating Glare From License Plates

When the state of Washington adopted aluminum license plates and painted only the raised numerals, they found that the bright aluminum surface reflected so much light that the license numbers could not be read at night. With the installation of a special Wheelabrator cabinet to grit blast the surface of the plates prior to painting the numerals, this difficulty has been eliminated . . . the fine matte finish diffuses the light so that glare has been completely eliminated and the paint adheres better to the numerals.

Not a Fault in a Carload



Approximately 65 sheets, varying in size from 16" to 59", are Wheelabrated hourly to provide a uniformly cleaned welding surface.



The Hotpoint automatic electric water heater has leak-proof seams because the welding surface is thoroughly cleaned by Wheelabrating.

A scale-free surface is essential for obtaining a leak-proof welded seam. In the case of the Hotpoint automatic electric water heater, this clean welding surface is obtained by Wheelabrating the two edges of the steel sheet before it is rolled into a cylinder. Each tank is hydrostatically tested to withstand 300 pounds pressure, although normal city water pressure is only 60 to 75 pounds.

★ ★ ★ ★

Appearance of Zinc Die Castings Improved

An Indianapolis firm has found that by Wheelabrating zinc die castings for automotive fuel pumps, a very uniform appearance is obtained. They had formerly painted all parts due to their inability to get a suitable finish with washing equipment. Cleaning costs were reduced 40%. Besides this, the Wheelabrator eliminated washing and paint spray equipment plus the many objections to paint handling.

American
WHEELABRATOR & EQUIPMENT CORP.
510 S. Byrkit St., Mishawaka 3, Indiana

Manufacturers of WHEELABRATOR ®
Airless Abrasive Blast Equipment

There's no ceiling on . . .

1. Are easy to apply—*No calculation of short circuit capability necessary.*
2. Will *not* be out-moded by future growth in KVA—*at plant or central-station source.*
3. Require no spare-units—*no fuses to replace after a fault.*
4. Reduce effect of "short"—*clear back to the power source.*
5. Give *permanent* protection—today and forever.

*Trade-mark (Volt-Ampere-Limitor)

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Throughout 1948 there was a persistent but slight rise in exports of merchandise accompanied by a slight fall in imports. Invisible exports, however, deteriorated so that there was a total deficit in 1948 of the same magnitude as in the preceding year. It was thanks to very large doses of American aid that this deficit did not lead to disaster. Marshall dollars financed 45 pct of French imports last year.

The structure of French trade during the year showed some changes, though not necessarily in a more hopeful direction. In 1947 France drew one half of its imports from the dollar zone; in 1948 this ratio had fallen to one third but simultaneously there was an increase in the country's deficit with the sterling area. In terms of commodities there were also variations. Imports of food declined and exports of coal were up, mainly because of the incorporation of the Saar. Indeed, but for the expansion of coal sales, French exports, seriously affected by deterioration in the textile market, would have contracted. The pessimist might well draw the conclusion from this section of the report that during 1948 France added to its intractable dollar deficit an intractable sterling deficit.

IN its conclusion the report does not conceal its fear that France's present demiprosperity contains some shady and precarious elements. The fruits of the improvements in production have perhaps been distributed somewhat too lavishly at home. The second of the planners' original ideals—to raise the French standard of living—has pushed its way ruthlessly to the head of the queue. Of the gains registered in 1948, as much as 39 pct was utilized to raise the standard of living, 38 pct went towards closing the trade deficit, and 23 pct to reconstruction and investment. The primary goal—national solvency—still lingered on the distant horizon.

The report shows an acute awareness of this failure, and throughout the document there is an urgent emphasis on the problem of output per man hour and per man year. The statistical evidence on productivity in France is at present thin and the Commissariat promises a special report on the subject.

Boosts Welding Speeds 75% with "Manual Lincolnweld"

By EDW. F. ARNTZEN
Sales Engineer
A. C. Woods & Co., Rockford, Ill.

USE of the hidden arc welding process of the "Manual Lincolnweld" in the fabrication of machine tool weldments has increased our welding speeds three to six times over previous hand welding . . . has eliminated spatter cleaning, minimized joint preparation, and reduced distortion and cracking problems. These cost savings and product improvements contribute materially to the advantages already gained by the changeover of these parts to welded design.

In fabricating the weldment shown in Fig.1, we assemble and hold in place the various members by tack welding. The units are then sent to the welding floor for complete welding. Finish welds are made with the "Manual Lincolnweld" machine except at inaccessible places where hand welding is used. On parts such as this, we have increased welding speed 50% to 75% with "Manual Lincolnweld." All welds were made with a single pass, and very little distortion and no cracks were encountered.

To weld channels into box sections for press frames, we clamp the welding gun to a radiograph as shown in Fig. 2. Joints are 3/8" thick, bevelled. The 45-inch single butt welds (one on each side of the box) are made at a speed of 25 inches per minute. Floor-to-floor time is 10 minutes, compared to 30 minutes for the former method.

The high speed of "Manual Lincolnwelding" reduces distortion and joint-cracking problems which were formerly encountered in large parts such as the base shown in Fig. 3.

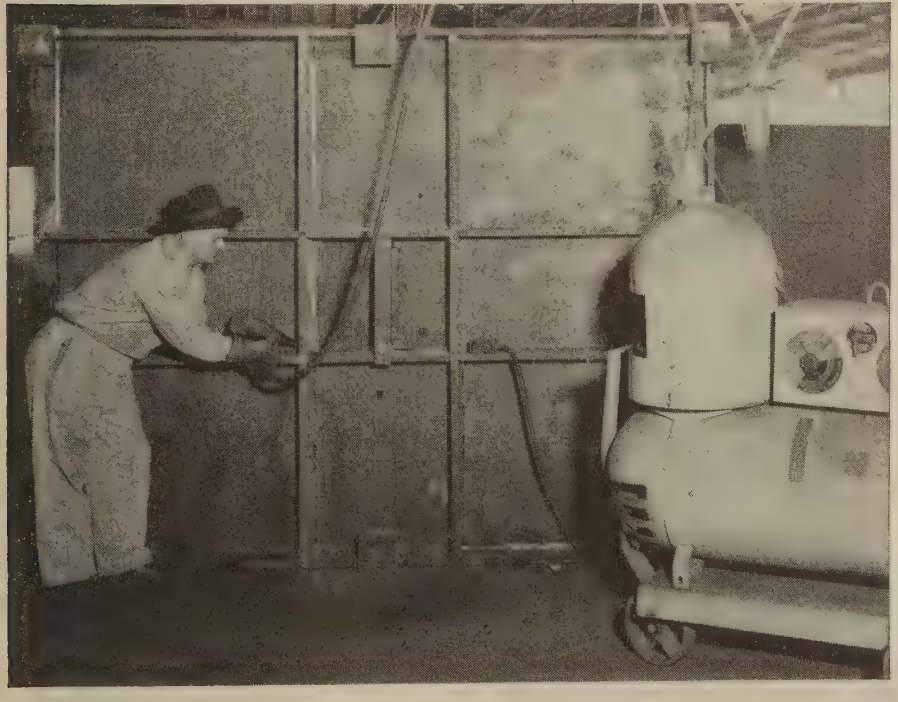


Fig. 1. "Manual Lincolnweld" fabricates this weldment at a speed of 50% to 75% higher than that of former method and eliminates cleaning.

Fig. 2. Mounted on radiograph carriage, "Manual Lincolnweld" gun boosts output of these box sections 200%.

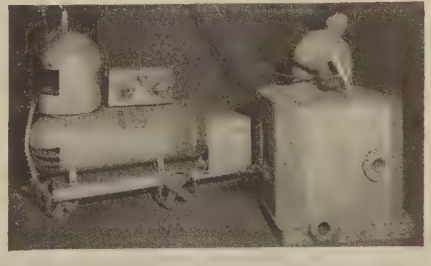
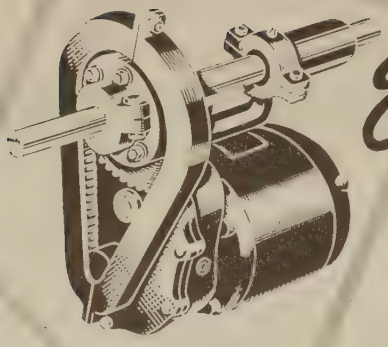


Fig. 3. Speedy, concentrated heat of "Manual Lincolnweld" reduces distortion and cracking problems in welding of parts such as this base.

The above is published by **THE LINCOLN ELECTRIC COMPANY** *in the interests of progress.*
Write for free copy of "Manual Lincolnweld," Bul. 373. The Lincoln Electric Company, Dept. 57, Cleveland 1, Ohio.

YOU CAN HAVE



Electric travel

FOR YOUR

HAND TRAVELED CRANES

THE NORTHERN

"TRAVELATOR"

You can cut handling costs substantially, increase the usefulness, and add years to the useful life of hand traveled crane equipment by converting with power travel bridge and pendant push button "Travelator" control.

This low cost unit is easy to install—your own mechanics can install it in a few hours. No dismantling of any crane parts, except to remove the old hand chain, is necessary or required.

Let us send you Bulletin No. 140T showing the advantages and simplicity of this installation.

OVERHEAD ★ ELECTRIC CRANES ★ AND HOISTS ★

NORTHERN ENGINEERING WORKS

2615 Atwater St., Detroit 7, Mich.

PERSONALS

(CONTINUED FROM PAGE 106)

• **H. P. Barnes** has been appointed manager of the Plibrico Sales & Service Co., Pittsburgh.

• **F. M. Urban** has been appointed sales manager of engineered rubber products and **H. Leon Moran**, factory manager, Fort Wayne, Ind., plant, U. S. Rubber Co., New York. Mr. Urban joined the company in 1929 and since 1946 has been merchandise manager for the company's mechanical goods division. Mr. Moran joined U. S. Rubber in 1922 and since 1946 has been manager of engineered rubber products at the Fort Wayne plant.

• **Harley A. Gardner** has been named treasurer of the Willard Storage Battery Co., Cleveland, replacing **I. K. Schnaitter**, who has resigned as treasurer and assistant secretary for reasons of health. **C. H. Bell** has been appointed assistant secretary and **J. C. Crum**, assistant treasurer, succeeding Mr. Gardner, who has been with the company since 1927. Mr. Gardner has been assistant treasurer since 1943. Mr. Schnaitter started with the company in 1916 as credit manager. He had been treasurer of Willard since 1932 and was elected a director of the company in 1941. Mr. Bell became associated with the company in 1928 as an attorney in the legal department. Mr. Crum joined the company in 1948.

• **C. J. Sayles** has retired after 50 years of railroad service, 45 of which were in the employ of Wabash Railroad Co., St. Louis. Mr. Sayles has been executive assistant to vice-president in charge of traffic. His retirement is effective June 30.

• **J. M. O'Brien** has been appointed assistant sales manager of Klem Chemicals, Inc., Dearborn. He had formerly been southwestern division manager for the Diversey Corp. in Kansas City.

• **Fred V. Hart** has been appointed industrial representative of Paulsen-Webber Cordage Corp., New York. Mr. Hart had formerly been a member of the sales department of Plymouth Cordage Co.

STAINLESS lets you spin 'em BIG!

This large stainless steel tank end being spun to the desired radius is made up of standard width sheets of "18-8" welded together and the welds ground smooth.

(Below) Another large stainless steel tank end, already spun to shape, shown here being polished.

HERE is austenitic chromium-nickel stainless steel, Type 305, being spun into a huge tank end. Another, of Type 302 . . . spun to shape and receiving a polish . . . is pictured at the left.

These large units attest to the adaptability of austenitic stainless steels to this method of fabrication.

Types 302, 304, and especially Type 305, lend themselves well to modern spinning operations according to the producers of these tank ends, Milwaukee Metal Spinning Company (Spincraft) of Milwaukee 8, Wisc. On a production basis, this company spins heads and ends for milk storage tanks ranging from 36 to 102 inches in diameter.

This is only one of many applications in which advantage may be taken of the various useful properties of chromium-nickel stainless steels.

You can trim bulk and deadweight by specifying correct types of stainless. They are strong yet tough, moreover, they resist wear and abrasion.

You get long service life because these alloys are resistant to attack by nearly all oxidizing acid conditions. They assure long, trouble-free performance of equipment, and hygienic cleanliness as well as economy in food, drug, chemical and other process industries.

Leading steel companies produce austenitic chromium-nickel stainless steels in all commercial forms. A list of sources of supply will be furnished on request.

EMBLEM OF INCO SERVICE TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the properties, treatment, fabrication and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes, nickel silver, cupro-nickel and other alloys containing nickel. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

ALL through the summer... through hot, humid days and hot, humid nights . . . the biggest thief in America will be raiding your plant, stealing your profits, stealing your steel!

In every department—where raw steel comes in, where steel parts are stamped or milled or machined or ground, where steel products are pickled or cleaned or assembled—the moisture in the air is always helping that big thief, RUST, to rob you of production—atom by atom — taking pennies and dimes and dollars out of your pocket.

But you don't have to put up with this monstrous moist-month thievery! The Oakite Technical Service Representative in your vicinity can help you fight RUST. He is well equipped with materials for (1) preventing rust, (2) removing rust, (3) cleaning and de-rusting in one operation and (4) simultaneously imparting rust-resistance and improving paint-adhesion.

FREE Phone your Oakite Technical Service Representative or write to Oakite Products, Inc., 30H Thames St., New York 6, N. Y., for full information on Oakite methods for arresting RUST in every part of your plant.

OAKITE

OAKITE 1909 1949 40th ANNIVERSARY YEAR

SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

Detroit Grand Jury Returns Indictment Charging Price Fixing

Washington

• • • **Attorney General** Tom C. Clark has announced that a Federal Grand Jury in Detroit, has returned an indictment charging that the Gray Iron Founders Assn. of Detroit, eight corporations, and eight officers of these corporations conspired to fix sales prices for gray iron castings in the Detroit area, in violation of the antitrust laws.

The corporations indicted operate foundries in Detroit in which various types of castings are made, including large dies used in the automobile industry. The sales of castings by the members of the association amounted to more than $13,000,000 during 1948.

It is charged in the indictment that since 1947 the Gray Iron Founders Assn. and its members have held meetings in Detroit, at which prices for castings were fixed.

In announcing the action of the Grand Jury, Attorney General Clark stated: "The fixing of prices by competitors for the sale of articles moving in interstaate commerce has been condemned many times by the courts. Such price fixing deprives purchasers of the benefits of price competition to which they are entitled under our system of free competitive enterprise."

In addition to the Gray Iron Founders Assn., the following, all of Detroit, are named as defendants:

Atlas Foundry Co. and Wm. Crawford, president; Detroit Gray Iron Foundry Co., and M. L. Gardner, president; Central Iron Foundry Co., and Leigh Middleditch, vice-president and general manager; Motor & Machinery Castings Co., and Joseph H. Barron, president; Acme Foundry Co. and J. D. Christian, vice-president; Stuart Foundry Co., and Stanley G. Lakin, assistant vice - president; Apex Foundry, Inc., and Emil A. Wulz, president, Eureka Foundry Co. and Harvey Elliott, president.

EUCLID *Cranes*

THE REPEATED CHOICE of LEADERS in the HEAVY INDUSTRIES

STANDARD MODELS MEET OVER 90% OF YOUR REQUIREMENTS

For many successive years, Euclid Cranes have fulfilled the most rigid material handling requirements of long established heavy industries. Proved performance with long trouble-free service has resulted in standardization and repeat orders. 1/2 to 100 tons capacity. Spans up to 100 ft. Write for literature.

EUCLID CRANES AND HOISTS *Raise Profits*

THE EUCLID CRANE & HOIST CO.

1361 CHARDON ROAD • EUCLID, OHIO

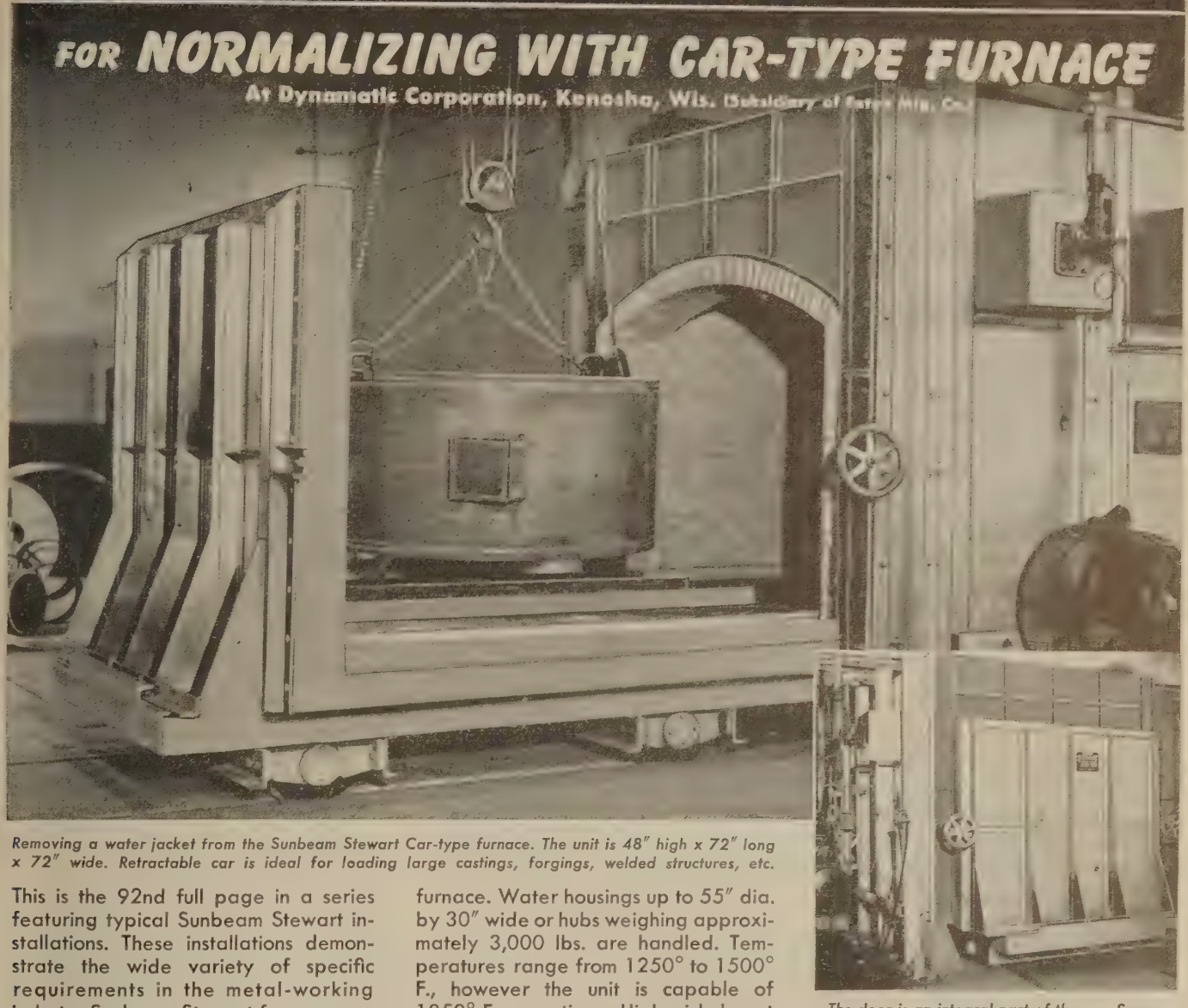
No. 92 of a Series of Typical Installations

Sunbeam STEWART

THE BEST INDUSTRIAL FURNACES MADE

FOR NORMALIZING WITH CAR-TYPE FURNACE

At Dynamatic Corporation, Kenosha, Wis. (Subsidiary of Eaton Mfg. Co.)



Removing a water jacket from the Sunbeam Stewart Car-type furnace. The unit is 48" high x 72" long x 72" wide. Retractable car is ideal for loading large castings, forgings, welded structures, etc.

This is the 92nd full page in a series featuring typical Sunbeam Stewart installations. These installations demonstrate the wide variety of specific requirements in the metal-working industry Sunbeam Stewart furnaces are designed to meet. Sound engineering and quality workmanship are behind this continuous record of delivered satisfaction.

To obtain more consistent, first quality heat treated work and overcome delays of assigning work to outside sources, Dynamatic Corporation installed a Sunbeam Stewart Car-type furnace. Water housings up to 55" dia. by 30" wide or hubs weighing approximately 3,000 lbs. are handled. Temperatures range from 1250° to 1500° F., however the unit is capable of 1850° F. operations. High nickel cast iron sand-seals give a perfect seal, eliminate excess heat loss and undue scaling.

It will pay to consult Sunbeam Stewart on your heat treating problems. Sunbeam Stewart builds a full line of standard furnaces, atmosphere and brazing, continuous conveyor units and galvanizing equipment.

The door is an integral part of the car. Saves time, reduces overhead space, and gives a better seal between door and furnace.

FREE ON REQUEST

SUNBEAM STEWART VEST POCKET HEAT TREATING DATA BOOK

Seventy-two pages of charts, tables, diagrams, factual data . . . ready reference book for all types of engineers. Write Sunbeam Stewart, Dept. I.0, for your personal copy.

SUNBEAM STEWART INDUSTRIAL FURNACE DIVISION of SUNBEAM CORPORATION

(*Formerly* CHICAGO FLEXIBLE SHAFT CO.)

Main Office: **Dept. 110, 4433 Ogden Ave., Chicago 23** — ***New York Office:*** **322 W. 48th St., New York 19** — ***Detroit Office:*** **3049 E. Grand Blvd.**, Detroit

Canada Factory: **321 Weston Rd., So., Toronto 9**

A letter, wire or 'phone call will promptly bring you information and details on SUNBEAM STEWART furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a SUNBEAM STEWART engineer will be glad to call and discuss your heat treating problems with you.

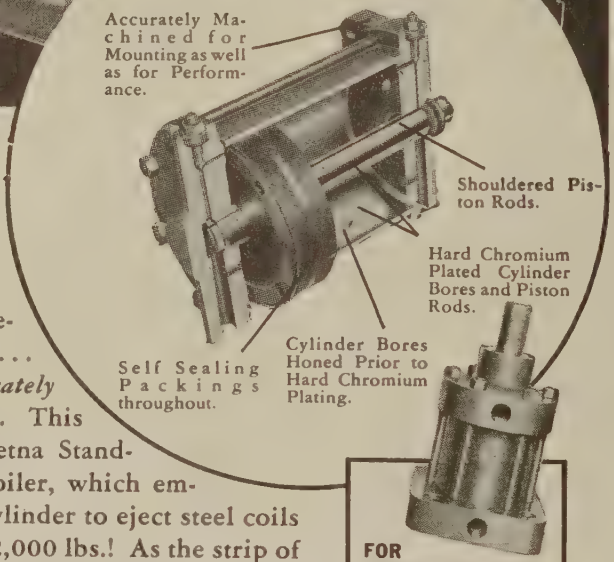
Job File No. 1001

T-J CYLINDER

EJECTS 6-TON STEEL COILS

Saves Labor... Speeds Production... Cuts Costs!

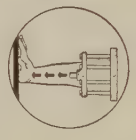
T-J Built to "TAKE IT" on Tough Jobs!

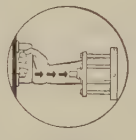

Accurately Machined for Mounting as well as for Performance.
Shouldered Piston Rods.
Hard Chromium Plated Cylinder Bores and Piston Rods.
Cylinder Bores Honed Prior to Hard Chromium Plating.
Self Sealing Packings throughout.

Here's another example of T-J Cylinders doing a job of power movement for industry . . . *efficiently . . . accurately . . . automatically.* This machine is an Aetna Standard Roll Type Coiler, which employs a T-J Air Cylinder to eject steel coils weighing up to 12,000 lbs.! As the strip of steel is completely coiled, kick-out fingers operated by the cylinder raise the coil and push it forward where it rolls on to conveyor.

T-J Air and Hydraulic Cylinders are built for 1001 tough jobs like this, where pushing, pulling or lifting is needed . . . 100 lb. or 50,000 lb. Available in many standard sizes and styles . . . both cushioned and non-cushioned types. Backed by 32 years' experience . . . built for long-life dependability. Write for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION





100 LB. or 50,000 LB.

T-J **32 YEARS EXPERIENCE**

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

National Metal Show's Main Theme to Stress Economy in Production

Cleveland

• • • **Economy in production** will be the central theme of the 31st National Metal Congress and Exposition in Public Auditorium here, Oct. 17 through Oct. 21.

This will be one of the first postwar industrial events to concentrate national attention on the greater efficiency of modern industrial equipment by actual demonstrations of what the equipment will do to effect savings and thus reduce the unit cost of the product or part it helps to make, according to ASM.

Principles of cost cutting will be emphasized at the special technical and educational sessions of the Metal Congress, and production economy will be graphically demonstrated by the exhibitors who, with either materials, equipment or processes, will illustrate the proper application and efficient operation of their product as a contribution to savings in production.

"The metal industry is going all-out on this point of savings along the line of metals processing and fabrication," said W. H. Eisenman, managing director of the event.

"**Within the industry** lies the basic first step toward reducing unit costs of all products made of metal. Hundreds of prominent exhibitors who will be in the October Metal Show have the equipment and the skill to bring about substantial savings in production costs. Their purpose in being a part of the Metal Exposition is to show why their equipment or process reduces costs, and to show how this is done."

ASM anticipates attendance of more than 50,000 management officials, metals engineers, production specialists and sales executives at the Cleveland Metal Show for 1949.

Cooperating in this drive to establish savings in metal processing and fabrication will be American Society for Metals, American Welding Society, Metals Div., American Institute of Mining & Metallurgical Engineers and Society for Non-Destructive Testing.

KAYDON Radial Ball Bearings
15.000" x 19.000" x 2.000"
in Food Machinery
Corporation's New Juicer

KAYDON BEARINGS

help SUPER JUICER squeeze 480 OPM*

*Oranges per minute

KAYDON Bearings play a very important part, say the designers, in this remarkable machine, so aptly christened the FMC SUPER JUICER. KAYDON precision radial bearings support the entire revolving head, including the actuating cam and upper cups of the squeezing mechanism, the head traveling smoothly, 24 revolutions per minute.

SUPER JUICER is *right!* Produces upwards of 300 gallons of juice per hour. It's super *juice*, too . . . tastes fresher, keeps better . . . since the juicing operation keeps the juice from the inside of the citrus fruits from mixing with the oil from the rind.

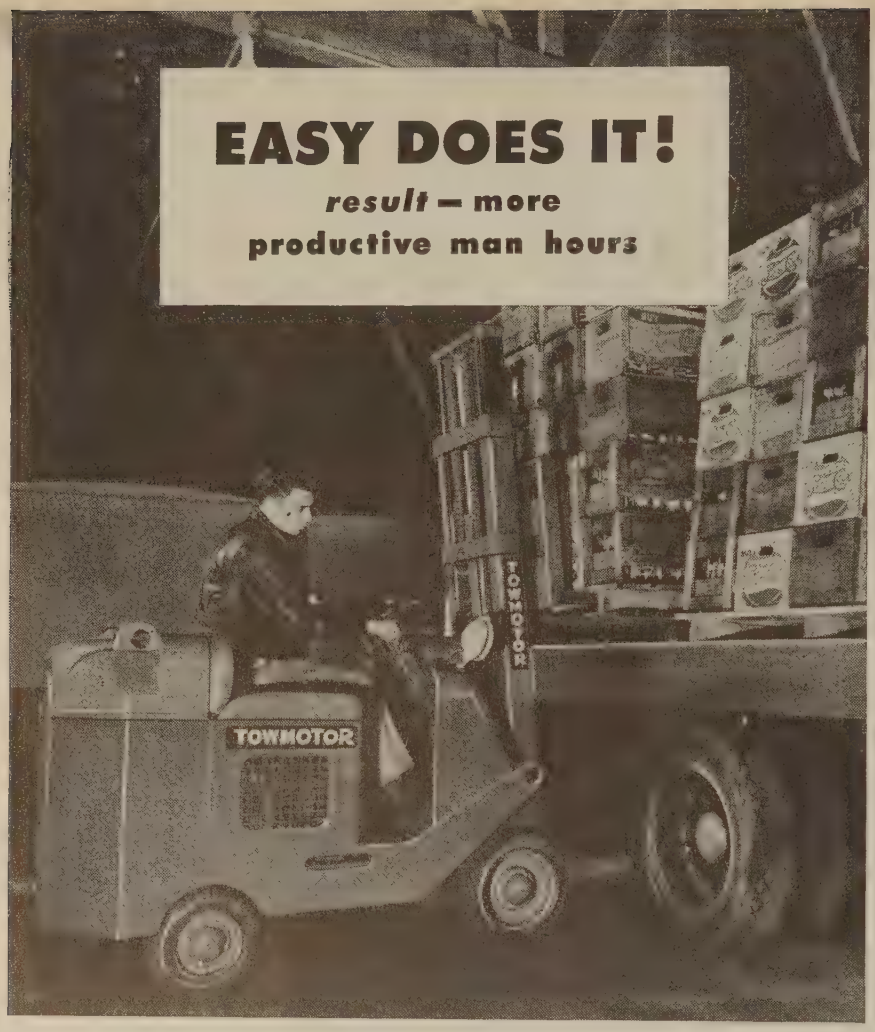
FMC engineers recognize the advantages of KAYDON precision bearings, just as designers of many other types of heavy-duty machinery do, in such widely varied fields as oil field machinery, rock-crushers, grinders, steel mills and paper mills, road equipment, excavators, hoists, bending machines and other heavy-duty equipment.

For sound bearing-cooperation, contact KAYDON.

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

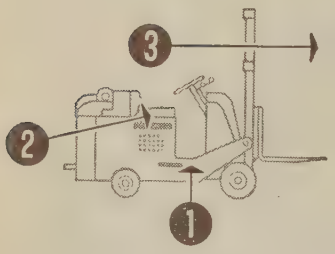
THE KAYDON ENGINEERING CORP.
MUSKEGON • MICHIGAN

All types of Ball and Roller Bearings 4" bore to 120" outside diameter



every handling job is easier with

TOWMOTOR MH!



1-LOW STEP-UP 2-WIDE SEAT
3-GOOD VISIBILITY

—Towmotor Efficiency Features

Your driver is seated at his important task . . . with plenty of leg room, seat room and "see" room to do a more efficient, faster, better job.

Another development pioneered by Towmotor is the exclusive design which permits greater freedom and ease of operation for the fork lift truck operator—increasing his alertness and efficiency in the safe handling of loads up to 15,000 lbs. Compare Towmotor with any other lift truck and you will see why Towmotor's outstanding features make every Mass Handling job easier, faster, safer. Write for a copy of the "Operators Guide." Towmotor Corporation, Div. 15, 1226 E. 152nd St., Cleveland 10, Ohio. Representatives in all Principal Cities in U. S. and Canada.

TOWMOTOR
THE ONE-MAN-GANG ®

FORK LIFT TRUCKS and TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

Capacity Operations For Western Steel Plants

Salt Lake City

• • • **Among major steel** plants still operating at capacity are the Colorado Fuel & Iron Co. in Pueblo, Colo., and Geneva Steel Co. in Utah.

Carl W. Meyers, president of CF&I, attributes the relatively strong position of these western plants to the fact that they built up larger backlogs during the shortage and drew fewer cancellations as production overtook demand. The cancellations, however, are coming in and he expects a tapering off in production in the not too distant future.

But the CF&I president is convinced that the decline in market demand is currently greater than the decline in consumption. During the period of acute shortage, he reasons, consumers sought to protect themselves by buying everything they could get. Now that they no longer have any fear about being able to fill their needs in the future, they are working off the excess inventories with the result that demand has fallen below consumption. On this reasoning he expects a period of tapering off and then a strengthening of the market.

CF&I, he reports, expects to get its new $5,500,000 rod mill into production by next September.

Win Honorable Certificates

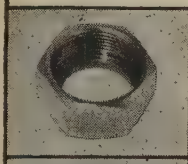
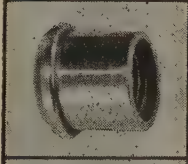
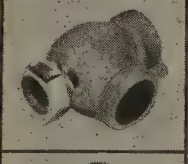
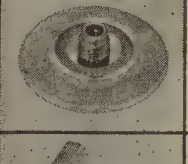
Pontiac

• • • **For the second** consecutive year Pontiac Motor Div. publications have won honorable mention certificates in the annual publications contest sponsored by the International Council of Industrial Editors. More than 650 company-sponsored publications were entered in the contest. Both the Pontiac Chieftain, dealer publication, and Pontiac Warrior, employee publication, scored 86 pct on their 1948 entries.

The publications are judged on the basis of accomplishment, editorial content, design and effectiveness.

Hugh V. Munce and F. Plummer Whipple are editors of the Pontiac publications.

PRODUCTION RECORD

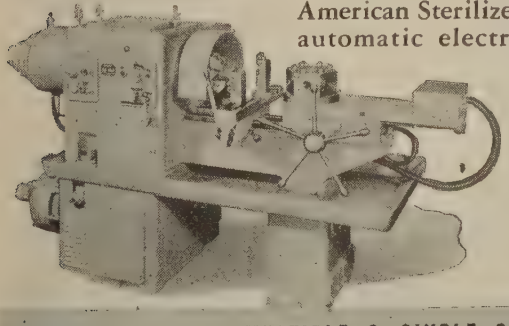
PART	PART NAME	OPERATIONS	PRODUCTION	COST	NOTES
	½" UNION NUT	TAP, BORE, CHAMFER, CUT OFF	UP 112.9%	DOWN 52.7%	CHANGE FROM CASTING TO BAR STOCK—ELIMINATE MILLING OPERATION
	½" FEMALE SPUD	BORE, TURN, TAP, SEAT	UP 44.2%	DOWN 30.8%	COMBINATION TOOLING
	¾" MALE SPUD	TURN, THREAD, SEAT	UP 38.2%	DOWN 26.8%	COMBINATION TOOLING
	½" GLOBE VALVE BODY	TURN, THREAD, SEAT	UP 25.0%	DOWN 20.4%	COMBINATION TAPPER AND THREADER
	VALVE REGULATOR VALVE BODY	BORE, TAP, THREAD	UP 44.4%	DOWN 32.3%	COMBINATION TAPPER AND THREADER
	TOP FLANGE CONTROL VALVE	DRILL, TAP, TURN, FACE, THREAD, CHAMFER	UP 121.1%	DOWN 56.3%	COMBINATION TURN AND FACE
	1" FLOOR FLANGE	DRILL, TURN, THREAD	UP 116.7%	DOWN 53.0%	COMBINATION TURN, FORM AND FACE

Electro-Cycle TRADE MARK BOOSTS PRODUCTION 70.5% at American Sterilizer

● This chart shows what happened on seven typical brass jobs when the American Sterilizer Company of Erie, Pennsylvania, routed them to its new Warner & Swasey 16" Electro-Cycle Turret Lathes.

Using semi-skilled instead of skilled operators, American Sterilizer found that automatic electronic head-stock control and faster, easier machining raised production an average of 70.5% and dropped costs 38.9%!

Find out how the Warner & Swasey Electro-Cycle Turret Lathes can boost output and cut costs for you. Call your nearest Warner & Swasey representative or write—



You can machine it better, faster, for less . . . with a Warner & Swasey

WARNER & SWASEY Machine Tools *Cleveland*

TURRET LATHES, MULTIPLE & SINGLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

THESE ACID TANKS WERE BUILT FOR CONTINUOUS MAINTENANCE—FREE SERVICE BY CEILCOTE

FROM DESIGN TO INSTALLATION OF CORROSION-PROOF EQUIPMENT YOU CAN RELY ON CEILCOTE

Our quarter century of experience is your guarantee of performance. When you plan construction of new pickling tanks, neutralizing tanks, floors, process tanks or fume ducts write for recommendations concerning your specific operating conditions. Representatives in most principal cities.

Ceilcote Products include acid and alkali proof —

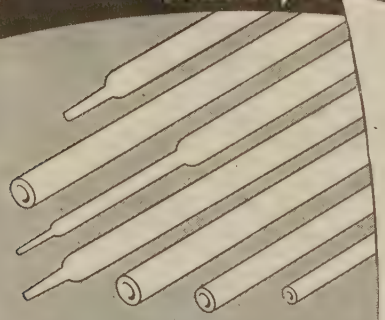
- Linings
- Membranes
- Bonding Cements
- Brick
- Protective coatings

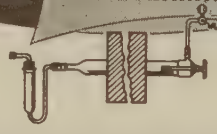
CEILCOTE *Corrosion Proof*
MATERIALS • CONSTRUCTION • SUPERVISION

The CEILCOTE *Company* ROCKEFELLER BUILDING • CLEVELAND 13, OHIO

McDANEL
HIGH TEMPERATURE PORCELAIN COMBUSTION TUBES *are Tops*

For Carbon and Sulphur DETERMINATIONS





Every stage of production in the manufacture of McDanel Porcelain Combustion Tubes and Zirco Tubes is carefully controlled to assure outstanding performance in your carbon and sulphur determinations.
Density, bore size, wall thickness, gas tightness, resistance to thermal shock — are all checked before shipment. When you receive your order of McDanel Combustion or Zirco Tubes from your supplier you may have complete confidence in their ability to give unexcelled service.

OTHER McDANEL PRODUCTS

- Non-Spalling, non-blistering, gas tight Combustion Tubes.
- High Temperature Zirco Tubes.
- Self Cooling Combustion Tubes.
- Refractory Porcelain Specialties in stock or made to your specifications for your individual needs.

Specify McDanel High Temperature Porcelain Combustion Tubes and Zirco Tubes from your supplier.

McDANEL
REFRACTORY PORCELAIN CO.
BEAVER FALLS, PA.

Urges Standardization Of Power Equipment As Way to Lower Costs

Atlantic City, N. J.

• • • To cut costs and give better service, a Westinghouse engineer urges standardization of power generating and distributing equipment. The advice came from A. C. Monteith, vice-president in charge of engineering, Westinghouse Electric Corp., in a talk at the Edison Electric Institute's 17th annual convention here.

The impact of volume production in reducing costs must be realized, he said. Power producers are caught between load growth and shortage of investment funds with which to expand, so standardization offers significant opportunity for relief, he argued.

Mr. Monteith listed some of the benefits of standardization, already apparent in the steam turbine line, and applying equally to others as: (1) Both users and manufacturers are able to plan ahead; (2) machines are more reliable because they have been "debugged" in service; (3) delivery schedules are less likely to be interrupted; (4) repair parts can be obtained more quickly; (5) workmen improve in proficiency as their work is repeated; and (6) experienced design engineers can devote their time to the next improvement within the standardization framework.

Experience with turbines demonstrates that standardization does not freeze development, the speaker asserted. Each manufacturer has had more time to improve blade materials, to develop better steam flows or any of the ways by which he tries to make his standard machine better. The same applies to other types of apparatus, Mr. Monteith concluded.

Will Launch Ore Carrier

Chicago

• • • **The "Wilfred Sykes,"** Inland Steel Co.'s new ore carrier, will be launched June 28 at Lorain, Ohio. This boat will be one of the largest and fastest ore carriers on the Great Lakes and is expected to be

ACCO Registered Wire Rope Sling solves a tough lifting job

A 75-ton roll had to be lifted from casting pit to grinder. Freeing the roll would increase the starting load. Chills hanging on would add another 20 tons. Overhead was low so roll had to be lifted vertically then horizontally. If the load slipped, the shock would tear cranes from their rails.

Acco engineers solved this problem with a standard Acco *Registered* 8-part Braided Wire Rope Sling (as illustrated). This sling gave them known strength on which to base their calculations. The strength was certified in writing and was based on an actual proof-test of twice the rated capacity.

You can get Acco *Registered* Wire Rope Slings—quickly—for the lifting jobs you have. Their certified strengths furnish a sound basis for your material-handling safety program. They are accurate tools for your safety engineer.

See how easy it is to order, and how safe it is to use Acco *Registered* Wire Rope Slings. Write today for literature.

MEMBER THE NATIONAL SAFETY COUNCIL

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Seattle, Tacoma, Bridgeport, Conn.

WIRE ROPE SLING DEPARTMENT
AMERICAN CHAIN & CABLE

ACCO Registered WIRE ROPE SLINGS

TRADE MARK

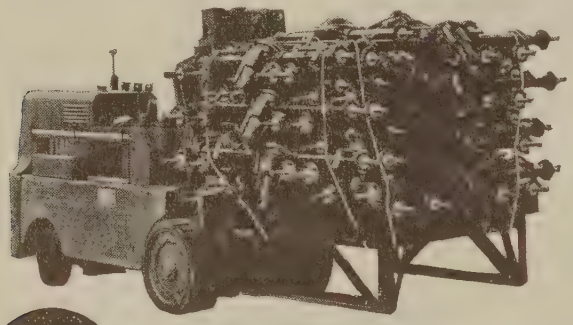
In Business for Your Safety

"The New Twist"
for your strapping operations
...GERRARD!

● Gerrard Round Steel Strapping is adaptable to almost every type of tying operation. Between the 18 gauge strapping for protecting parcel post packages and the 8 gauge strap for securing carload lots of steel pipe or machinery, there's a size of Gerrard Strapping that will do your job perfectly.

Because it's *round*, Gerrard Steel Strapping grips where it touches. It is ideal for pallets and has been used successfully to palletize such odd shaped objects as auto springs and rear axles. *And Gerrard Round Steel Strapping costs about 40% less than any other type of metal reinforcement.*

Gerrard engineers will gladly consult with you about your strapping problems free of charge. Send for the *Blue Book of Packaging*. It is free. GERRARD STEEL STRAPPING COMPANY, 4705 So. Richmond Street, Chicago, Ill.



Gerrard Round Strapping grips where it touches, conforms to the odd shape of the auto axles on the pallet.

USS
GERRARD
ROUND STEEL STRAPPING
UNITED STATES STEEL

Do you use Perforated Metal?

If perforated metal is required for any of your products, let Hendrick quote on fabricating it to your specifications. An unsurpassed stock of tools and dies, and ample plant facilities, enable Hendrick to give unexcelled service in furnishing perforated metal with any shape or size of openings, from any commercially rolled metal, in any desired gauge. Write for full information.

SEE OUR CATALOG IN SWEET'S

HENDRICK
Manufacturing Company
37 DUNDAFF STREET, CARBONDALE, PENNA.
Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

delivered in time to go into service for the 1950 navigation season. The new carrier will have an overall length of 678 ft which is described as the longest ship under construction in the United States today.

The speed of the "Wilfred Sykes" will be 16 mph loaded, 17½ mph light. This speed is expected to increase the number of round trips possible between Indiana Harbor, Ind. and Superior, Minn., from 34 to 44 trips a season. The new boat will be christened by Mrs. Wilfred Sykes, wife of the chairman of Inland's executive committee and former company president. The ceremonies will take place in the yard of the American Shipbuilding Co., Lorain, Ohio, who designed and built the vessel.

Dr. Warner Will Be New Head of Carnegie Tech

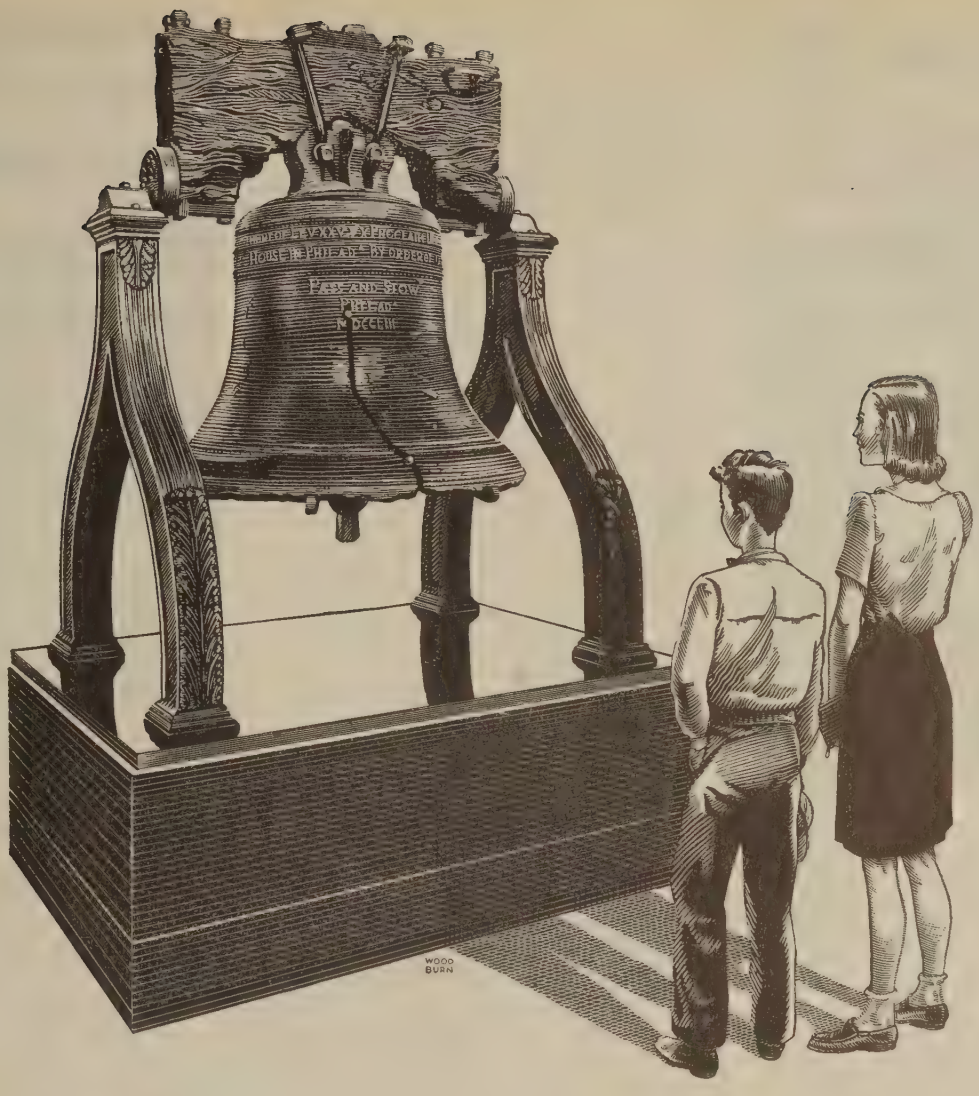
Pittsburgh

• • • **Dr. J. C. Warner,** dean of graduate studies and head of the chemistry department at Carnegie Institute of Technology, has been namer president-elect to succeed Dr. Robert E. Doherty, who will retire as Carnegie's president next year.

James M. Bovard, chairman of the Carnegie board of trustees, announced that Dr. Warner will fill a newly-created office of vice-president until his inauguration after Dr. Doherty's retirement, July 1, 1950.

For Dr. Warner, the announcement of his election climaxes 23 years of outstanding service on the Carnegie faculty. An instructor in chemistry in 1926 after work as a research chemist with commercial companies, the new president-elect moved from there up the academic ranks to become professor of chemistry and head of the chemistry department in 1938 and dean of graduate studies in 1945.

Dr. Warner was an important member of the team of scientists which turned out the atomic bomb. During a 2-year war leave from the campus, he directed and coordinated research on the purification of plutonium. He later participated in the operation of the Clinton Laboratories at Oak Ridge,



What price liberty?

IT was Daniel Webster who said, "God grants liberty only to those who love it and are always ready to guard and defend it."

Today in our yearning for "security", we are inclined to forget about that "liberty" for which this old bell rang out. The two are not synonymous. When we permit a benevolent government to assume more and more responsibility for housing, feeding, hospitalizing, and even entertaining our citizens, we must in return expect to surrender more and more of our personal rights and liberties.

Actually, the only security any man can enjoy with liberty is the security he earns through his own initiative, resourcefulness and productivity. As community leaders, it is our responsibility to help our fellow citizens realize that for the delusion of government-guaranteed security they are sacrificing liberty.

The Youngstown Sheet and Tube Company

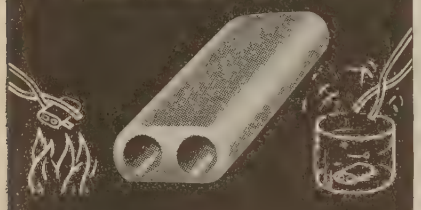
General Offices -- Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON, ALLOY AND YOLOY STEELS

ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES.

Be Certain WITH "SERV-RITE"

THERMOCOUPLE INSULATORS



This Gordon Thermocouple Insulator, heated red hot and plunged into cold water, came out just as good as new

Available only through GORDON, Serv-rite Thermocouple Insulators are made to stand the gaff of excessive thermal shock far above normal requirements.

For sturdy and reliable thermocouple insulator performance to meet peak production needs — Specify Serv-rite...a Gordon development backed by 32 years' experience in supplying industry with insulators that last longer and give better results.

Serv-rite Thermocouple Insulators—in any type or size—can be supplied immediately from Gordon's large stocks in the Chicago and Cleveland Plants. Remember—you can always distinguish Serv-rite Insulators by their *tan* color.

Fish Spine Beads
Asbestos Tubing
Double Hole Round
Asbestos String
Single Hole
Double Hole Oval

CLAUD S. GORDON CO.

Specialists for 32 Years in the Heat Treating and Temperature Control Field

Dept. 16 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 16 • 7016 Euclid Avenue • Cleveland 3, Ohio

Tenn., and is now a member of the Physical Science Advisory Committee to the Brookhaven National Laboratory and a Consultant to the Argonne National Laboratory.

Predicts Good Business But Readjustment Period

Buffalo

• • • **Business is good** and is going to get better, E. C. Wareheim president of Commercial Credit Co. of Baltimore said here recently. He added that there is no depression or recession, but merely "a readjustment period for certain industries, which has to be expected because of the huge turnover in the last 2 years."

The head of one of the world's largest finance companies predicted a continued increase in installment buying, especially in the automobile field.

"The installment buyer is just coming into the automobile market on a large scale," said Mr. Wareheim. "Last year many cars were not available for installment buying because of big fleet sales and cash purchases."

He said collections in all lines of his company's finance business continue good.

"There are no excessive delinquencies and no excessive repossessions," he reported.

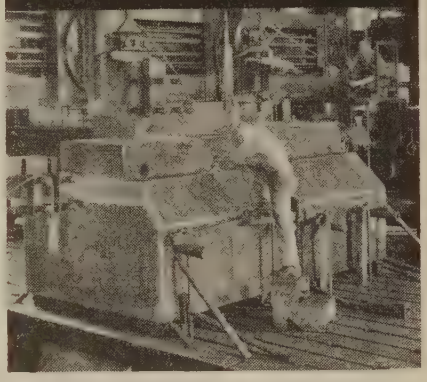
Awarded Honorary Degree

Troy, N. Y.

• • • **Thomas D. Jolly,** vice-president in charge of engineering and purchases for Aluminum Co. of America, was awarded the honorary degree of Doctor of Engineering at the commencement exercises of Rensselaer Polytechnic Institute on June 10.

Now president of the American Standards Assn., and a past president of the National Assn. of Purchasing Agents, Mr. Jolly has made many outstanding contributions to the advancement of knowledge in the engineering and purchasing fields. In 1948 he was named by former president Herbert Hoover as a member of the Advisory Committee on Government Procurement with the Commission on Organization of the Executive Branch of the Government.

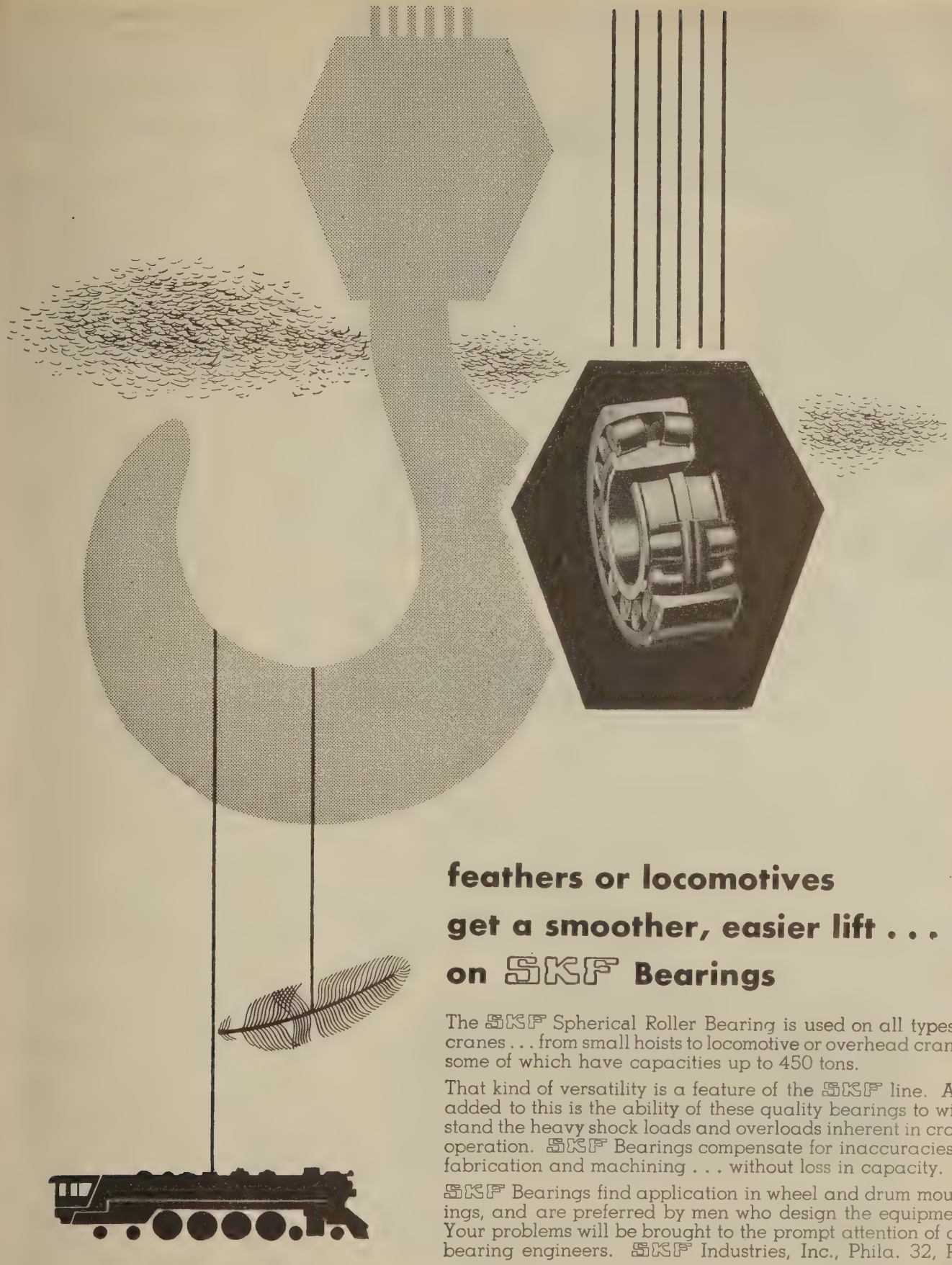
"Umpteen" Sizes of MACHINED CASTINGS your problem?



Continental CASTING AND MACHINING FACILITIES handle a range from 50 lbs. to 250,000 lbs.

CONTINENTAL regularly produces all sizes of intricate and unusually designed castings in any analysis of cast steel and in sizes from 50 lbs. to 250,000 lbs. Three large capacity foundries keyed to either custom or production operation and two heavy-duty machine shops offer you promptly scheduled delivery on a wide size range of castings to your specification. Send your drawings for quotation.

Continental FOUNDRY & MACHINE CO.
Chicago • Pittsburgh
Plants at:
East Chicago, Ind.; Wheeling, W. Va.; Pittsburgh, Pa.



feathers or locomotives get a smoother, easier lift . . . on SKF Bearings

The SKF Spherical Roller Bearing is used on all types of cranes . . . from small hoists to locomotive or overhead cranes, some of which have capacities up to 450 tons.

That kind of versatility is a feature of the SKF line. And added to this is the ability of these quality bearings to withstand the heavy shock loads and overloads inherent in crane operation. SKF Bearings compensate for inaccuracies in fabrication and machining . . . without loss in capacity.

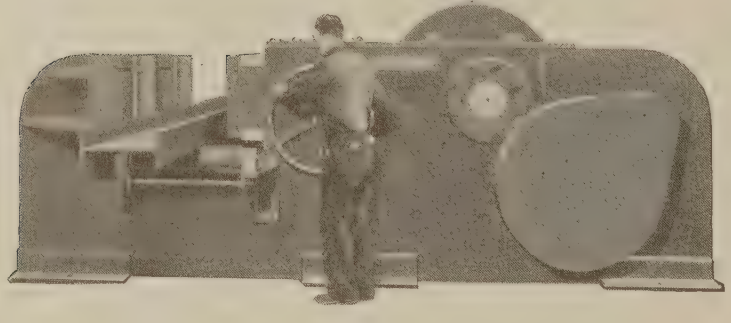
SKF Bearings find application in wheel and drum mountings, and are preferred by men who design the equipment. Your problems will be brought to the prompt attention of our bearing engineers. SKF Industries, Inc., Phila. 32, Pa.

6664

Crane and Hoist Bearings engineered by SKF

THOMAS

BENDING AND STRAIGHTENING Machines



THESE MODERN MACHINES are of all-steel construction and come in various sizes, in capacities from 50 to and including 400 tons. Convenient adjustments for easy, accurate operation.

Write for Bulletin 315

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, 23, PA.

9

Grants Franchises For Roofing and Fasteners

Cleveland

• • • **A new policy** of granting exclusive franchises for the sale of end-welded roofing and siding fasteners manufactured by Nelson Stud Welding Div., Morton-Gregory Corp., has recently been announced by Leonard C. Barr, vice-president and general sales manager.

First franchise has been awarded to the Nelson Construction Service Co., Cleveland, for the northern Ohio area. Robert A. Tissot, for 8 years construction products sales engineer, Barrett Div., Allied Chemical & Dye Corp., will head the Cleveland firm.

Mr. Barr said Nelson was planning to issue additional franchises as rapidly as possible to well-qualified concerns. "This new program will make our five types of special steel decking, corrugated roofing, and siding fasteners directly available to applicators in major industrial territories.

"Our business in this field has increased more than 35 pct since introduction of the special Rivweld and composite studs for the installation of corrugated iron and aluminum," Mr. Barr said. "A number of the country's larger concerns have reported reductions of 20 pct and more in the application cost of jobs on which they have used the Nelson method."

Franchise holders will also handle the sale and rental of Nelson stud welding guns to roofing and siding contractors.

States Strong Position Of Gray Iron Industry

Milwaukee

• • • **Competitive position** of gray iron in the castings market is considered "most satisfactory" and tending toward stabilization, R. L. Collier, executive vice-president, Gray Iron Founders' Society, told gray iron foundry executives recently.

While instances of inroads of competitive materials are noted from time to time, the overall position of gray iron in the market has shown a steady improvement in the past 5 years, Mr. Collier said.

Marginal displacements in the market, he stated, are most natural

in a free economy; particularly in cases where such gains or losses are based upon sound engineering considerations.

Illinois Leads in Value Added to Raw Materials

Chicago

• • • **The Chicago Assn.** of Commerce and Industry reports that the value added to raw materials by manufacture in Illinois, amounted to $6,674 million in 1947. This is an increase of 205 pct over 1939 when the value added was $2,187 million. Leverett Lyon, the association's chief executive officer, said that this production was 9 pct of the nation's total.

Illinois leads other major industrial states of the east and middlewest in the percentage of increase since 1939. Dept. of Commerce figures show the percentage of increase for Ohio 201.5 pct, New York 190.7, Massachusetts 181.9, Pennsylvania 180.4, and New Jersey 175.1.

Sheffield Steel Cuts Prices

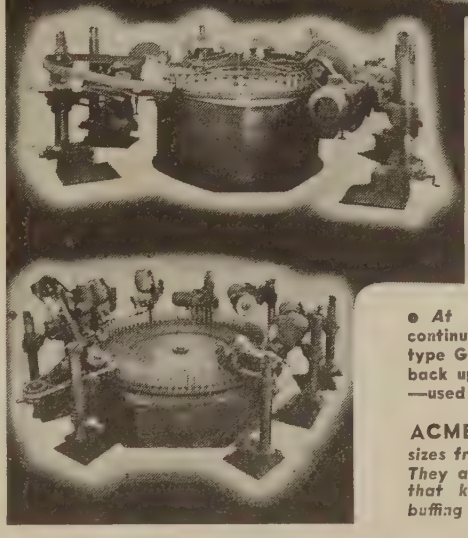
Houston

• • • **Effective June 15** Sheffield Steel Co. announced new prices on all their products. New prices are f.o.b. cars Houston, as follows: Carbon merchant bars $3.75 per 100 lb., alloy merchant bars $4.15, carbon structurals $3.65, bar size carbon strip $3.65, alloy strip $5.50, carbon plates $3.80, carbon sheets $3.65, alloy ingots $59 a net ton, alloy billets $71 a net ton, forging quality carbon billets $69 a net ton. New billets, reinforcing bars $3.75 per 100 lb, standard mesh $5.40, highway mesh $5.15, pipe mesh $5.15, wire rods $3.95, bright wire $4.55, annealed wire $5.20 and galvanized wire $5.65.

Sheffield officials told THE IRON AGE that the price reductions were made to meet competition. Prior to this Sheffield was receiving premium prices because of their natural geographic location and advantage they had held on freight rates. In recent weeks steel producing areas in Birmingham, Pittsburgh and Chicago, have shipped plenty of tonnages to Texas and in order to be competitive Sheffield was forced to cut their price.

ACME CONTINUOUS ROTARY Automatics

for Better, Lower Cost Polishing and Buffing



• *At Left:* ACME 6-ft. Continuous Rotary having—50 continuous revolving chuck spindles—1 polishing and 5 buffing heads, used for finishing octagon plumbing goods escutcheons.

• *At Left:* ACME 10-ft.—Continuous Rotary—96 continuous revolving spindles—used with 2 ACME type G-3 Universal polishing belt heads with floating back up wheel and 8 ACME type G-3 buffing lathes —used for polishing and buffing brass door knobs.

ACME *Continuous Rotaries are built in various table sizes from 20 inches to 10 feet or more in diameter. They are adaptable to a great many arrangements that keep finishing costs down on polishing and buffing operations.*

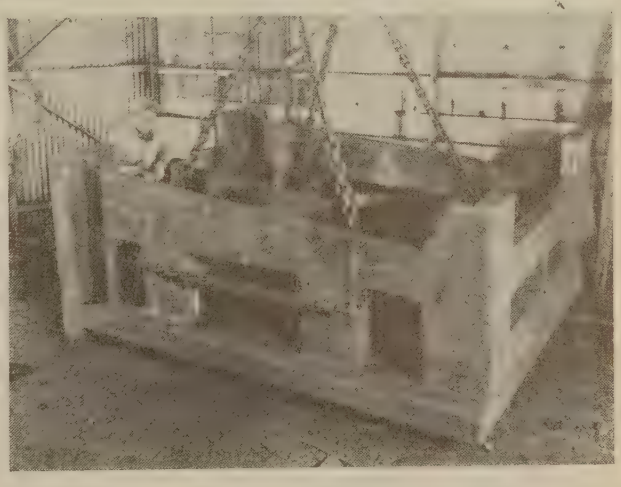
SPECIAL MACHINERY AMC AUTOMATIC BUFFING MACHINES

ACME Manufacturing Co.

1046 HOWARD ST. DETROIT 16, MICH.

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS

WHAT'S THE FINISHED COST?



In relation to the cost of machining this 18½-ton angle plate, a little difference one way or the other in the price of the casting itself is of small consequence. The chief consideration is the character of the casting—whether it will require the maximum or minimum of finishing.

If a sound, accurate casting costs more, it is worth more because of the savings in the machine shop. On the contrary, a distorted and defective casting entails so much extra finishing cost that it is expensive at a ridiculously low price.

Advance Castings are bought by customers who think in terms of the finished product. Yet they are keenly aware of casting prices and carefully check our quotations. They pay us only what they think Advance Castings are worth—and our business continues to grow.

If you are interested in custom castings that are really economical, we'd like to talk to you.

ADVANCE CASTINGS

THE ADVANCE FOUNDRY CO.
DAYTON 3, OHIO

STRENES METAL • ALLOY GRAY IRON • GRAY IRON

Prospects Appear Dim for Pickup in Machine Tool Sales Before Fall

• • • **Prospects** for a pickup in machine tool sales before fall appeared dim this week as the Labor Dept. reported that employment in the manufacturing industries dropped 320,000 between mid-April and mid-May, the eighth straight monthly decline.

According to the department's Bureau of Labor Statistics, "most of the drop reflects seasonal activity and a continuation of a declining demand for a substantial number of products."

On the other hand, qualified observers in the machine tool industry predicted that as demand for present lines or products declines, manufacturers will start to redesign or bring out entirely new products for which there is a potential demand, which will require new machine tools and other production equipment.

These observers also point out that the machine tool industry traditionally shows recession symptoms from 6 to 12 months in advance of the rest of the industrial economy, and therefore should be among the first to come out of the present business recession.

Business continued spotty in most major sales sectors this week.

There were a few signs of life in Detroit, where the tempo of machine tool activity has quickened slightly during the past week, although most suppliers find their 1949 volume is 30 to 40 pct below the same period of last year.

Placements by Detroit Gear Div.'s Borg-Warner Corp., for the new Studebaker automatic transmission have been reported, although, it is understood, the bulk of the equipment for this job is still to be bought. There are also reports of activity for the new Fisher Body plant in Pittsburgh. Press orders, it is believed, are about ready and the tool room equipment is expected to be placed in the near future.

There is continued activity in diecasting work at Ford and some sources feel that important developments can be expected here in the not too distant future.

Present Decline Will Bring Out New Products for Which There Is a Demand

o o o

Meanwhile, local tool and die activity continues at a low level and Detroit foundry operations have been limping along for several months. Some buying by small plants has been noted here recently but there are no indications that this interest can be sustained in the face of decreased industrial activity.

In Cincinnati, American Services, Inc., a corporation to promote the sale of machine tools in Latin-American countries, has been authorized by Ohio Secretary of State, Charles F. Sweeney.

American Services, Inc. embraces three major Cincinnati machine tool builders, Cincinnati Milling Machine & Grinding Machines, Inc., Fosdick Machine Tool Co., and Cincinnati Lathe & Tool Co.

Other major machine tool builders who are charter members of American Services, Inc., are: Blanchard Machine Co., Cambridge, Mass.; Cone Automatic Machine Co., Inc., Windsor, Vt.; Heald Machine Co., Worcester; Hydraulic Press Mfg. Co., Mt. Gilead, Ohio; Jones & Lamson Machine Co., Springfield, Vt.; Monarch Machine Tool Co., Sidney, Ohio; National Automatic Tool Co., Richmond, Ind., and Thompson Grinder Co., Springfield, Ohio.

Chief purpose of the concern is to promote the sale of machine tools manufactured by member companies, to give technical assistance and the servicing and utilization of such equipment and to promote good will trade practices with Latin-American countries. Capital of the corporation will be used to finance the administration of credit so Latin-American purchases can be serviced financially through the Export-Import Bank.

American Services, Inc. will function as a credit pool, and according to trade sources, will provide an effective method of meeting the competition of the British machine tool industry.

In Hartford, seven small contract tool and die manufacturing shops have pooled their resources, with combined assets of more than $1 million, elected officers and directors and as Connecticut Mechanical Industries, Inc., are bidding for government contracts.

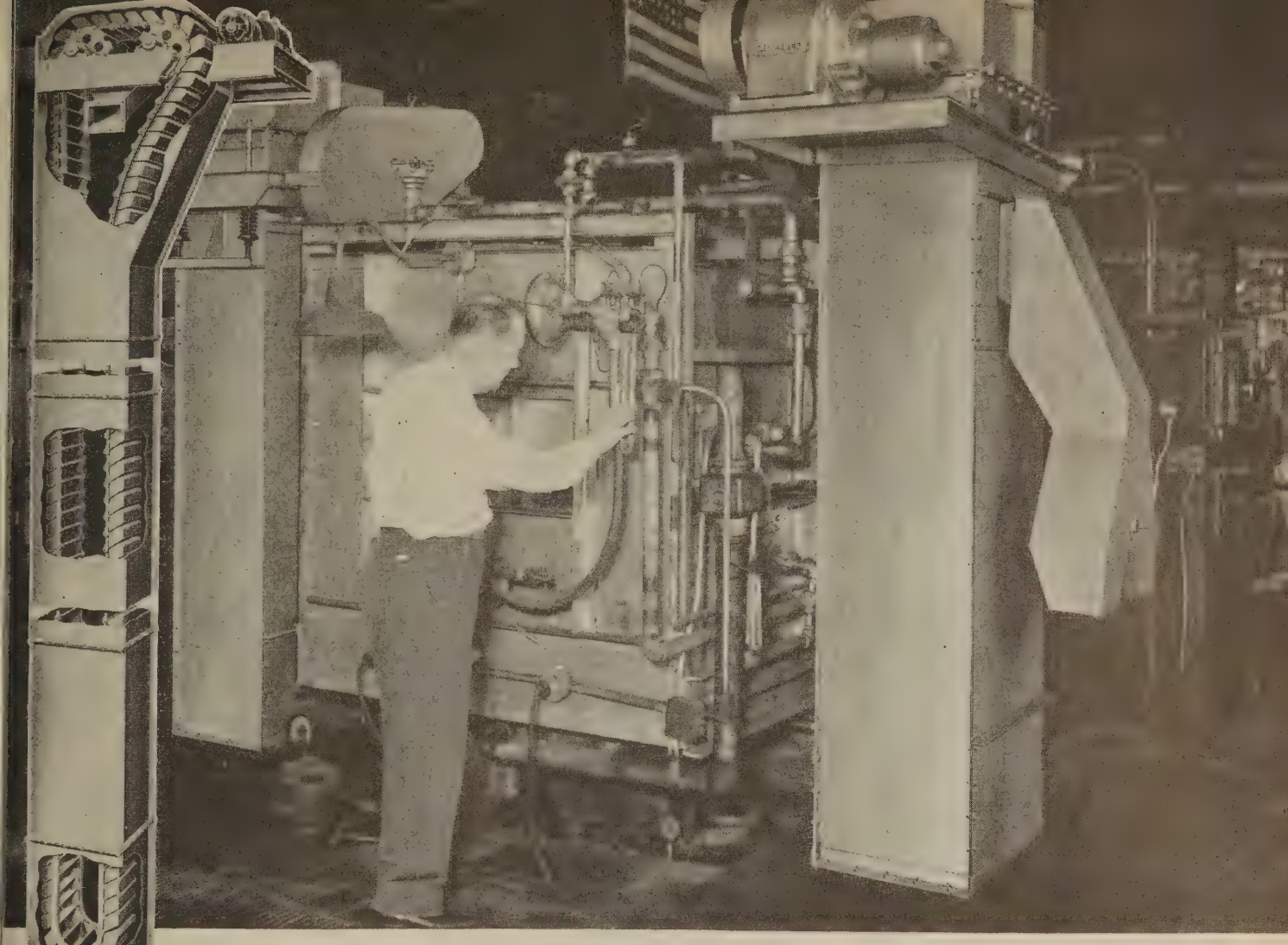
John H. Dowd, president of the group, has indicated that present steps may lead to a merger of the seven companies into a single organization.

In addition to Mr. Dowd, who is president, Johns-Hartford Tool Co., Herman Fink, president, Cooperative Tool & Machinery Co., New Britain, is vice-president; Charles Neumann, president, Argus Engineering Co., Hartford, is treasurer and John I. Carlson, treasurer, Cooperative Tool & Machine Co., Hartford, is secretary.

Directors of the group include the officers and O. J. Grandahl, senior partner, Grandahl Tool & Machine Co.; John D. Dewhurst, president, Arrow Tool Co.; Frederick W. Wennerberg, president, Swan Tool & Machine Co., all of Hartford, and Peter W. Zurles, president, Lake Mfg. Corp., New Britain.

In Cleveland, it was reported that Ford Motor Co. placed orders for some equipment for the Canton, Ohio, plant that had been on quotation for several months.

At Warner & Swasey Co., a back-to-work movement which started June 14, was called "a complete success" by company spokesmen, although Warner & Swasey officials and the union (International Assn. of Machinists) were in dispute on the number of production workers who returned to work. Neither side issued a statement on the number who had returned through IAM picket lines. Company sources said the movement was gaining momentum and that 172 had reported for work June 15. About 1800 employees are involved in the strike, which began Dec. 27.



LINK-BELT INTERNO

Bucket Elevator Handles Delicate Pieces *EXTRA GENTLY*

By turning a conventional bucket elevator inside-out, Link-Belt has developed a means of elevating relatively small pieces or parts which require gentle handling, and which cannot be handled safely by conventional elevating equipment.

Inwardly opening buckets load at an exceptionally low level, and discharge their contents with a gentle, pouring motion, in contrast to the throwing or dumping action of the usual bucket elevator. Loading and discharging spouts are on the broad side of the casing and either chutes or conveyors can be used to bring material to and from the elevator, giving wide flexibility in layout.

Illustrated above is an installation of two Interno Bucket Elevators lifting metallic pieces out of an oil quenching tank after heat treatment. Elevator buckets are perforated to permit oil to drain back into tank.

Cut-away view indicates double-head-shaft type for installations requiring increased elevator speed to gain greater handling capacity.

Folder No. 1983 gives full explanation and illustrates all details of the Interno Bucket Elevator. Write for a copy, and consult your nearest Link-Belt office for engineering suggestions on using Interno bucket elevators for mass handling of delicate materials or parts.

TYPES OF LINK-BELT CONVEYING MACHINERY

Belt Conveyors	Oscillating Conveyors
Screw Conveyors	Apron Conveyors
Bulk-Flo Conveyors	Flight Conveyors
Chain Conveyors	Bucket Elevators
Trolley Conveyors	Bucket Carriers

LINK-BELT COMPANY Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in Principal Cities. 11,407

LINK-BELT

CONVEYING MACHINERY

"THE COMPLETE LINE"

NONFERROUS METALS

. . . News and Market Activities

Copper, Zinc Prices Slip Again But Lead Price Holds Firm

New York

• • • **There were** further reductions made in prices of copper and zinc last week. But the price of lead held firm as strengthening factors appeared in the market.

Custom smelters reduced the copper price to 16.00¢, delivered Valley, on June 17, only 5 days after the previous reduction. This price reduction is the ninth made since Mar. 29 when price cutting began. The total saving to copper consumers since that date is 7½¢ per lb. The 16.00¢ price is only ⅝¢ above the last OPA price.

Further news has been reported on cutbacks in copper production here and abroad. But several observers believe that further cutbacks will have to be made before production begins to equalize with the current low level of demand. On this basis, the price of copper might well go somewhat lower before leveling off. Anaconda Copper Co. has announced that its operations in Chile will be cut back by about one-third.

The zinc price was reduced by ½¢ on June 16 to 9.00¢ East St. Louis, only 7 days after the previous reduction. This is the eleventh price cut in zinc since Mar. 23, for a total reduction of 8½¢ per lb. The present price is ¼¢ below the last OPA price. Some trade factors believe that the 9.00¢ price may hold for a while, as it is claimed that all the water has been squeezed out of the market at this level.

Demand is still very poor at this price, as consumers are apparently still able to live off their inventories. Industry production figures show considerable excess over shipments. The government will not stockpile slab zinc in the next fiscal year, as it did this year. Stockpiling activities will be confined next year to the conversion of ores and concentrates already held by the government on a toll basis.

The stockpiling bill for the next fiscal year has passed both Houses and is now in conference committee. The deficency stockpiling bill for the current fiscal year has not yet been passed by the Senate. The latter only runs until June 30, but if passed within a day or two of the closing date there would still be time to place the full tonnage of copper and lead required under present market conditions. It is known that stockpiling officials are set to take quick action once the bill becomes law.

Lead Is Only Bright Spot In Nonferrous Markets; Sales Reported Picking Up

o o o

The one bright picture in the metal markets is in lead where current sales are reported to be good. June shipments should be 12,000 to 15,000 tons heavier than in April or May, according to industry sources. It is still too early to expect any upward price action. There is still quite an accumulation of lead at the smelters. But demand is gradually improving and the smelters find it possible to go into the scrap market without fear of a market loss. It is apparent too that the supply of lead scrap is not burdensome as indicated by the gradual reduction in the smelting charge.

Stockpile officials have visited metals producers to find out how much metal they were prepared to offer in the next fiscal year and how their production was running.

The brass mills revised their mill products prices early this week to take into consideration the most recent reductions in lead and zinc. The brass mill industry as a whole is not buying at this time. It is learned that the order position of the Midwestern mills is very much better than the Valley mills, principally because of the way the automobile market has stood up. It is estimated that Midwestern mills may be operating at about 50 pct of capacity, compared with 35 to 40 pct for Valley mills.

Scrap metals prices have been revised downward based on the latest reductions in primary metals.

Developments this week have done little to clarify the confusion in the metals markets. The strengthening factors reported in lead have not spread any support to other metals, which continue to sag. Most trade sources are agreed that inventories of metals have been substantially reduced. But even this will be of little help if general business conditions continue to point downward.

The antimony market is quiet and weak. From Mexico comes a report of what may well be one of the largest deposits of antimony. The Mexican Geological Institute has reported the finding of ore in the Sierra de Coronado mountains in the state of San Luis Potosi. The ore body is only 7 miles from the railroad.

Nonferrous Metals Prices

	June 15	June 16	June 17	June 18	June 20	June 21
Copper, electro, Conn.	16.50	16.50	16.00	16.00	16.00	16.00
Copper, Lake, Conn.	18.625	18.625	18.625	18.625	18.625	18.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	9.50	9.00	9.00	9.00	9.00	9.00
Lead, St. Louis	11.85	11.85	11.85	11.85	11.85	11.85

Note: Quotations are going prices.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	16.00
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	11.85
Lead, New York	12.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask f.o.b. New York	$82 to $84
Nickel, electro, f.o.b. New York	42.93
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	71.50
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	9.00
Zinc, New York	9.70
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	13.75*	15.50
No. 120	13.25*	15.00
No. 123	12.75*	14.50
80-10-10 ingot		
No. 305		20.00
No. 315		17.00
88-10-2 ingot		
No. 210		26.50
No. 215		23.50
No. 245	16.50*	18.25
Yellow ingot		
No. 405	11.50*	13.25
Manganese bronze		
No. 421		18.00

*F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	19.00-19.50
0.60 copper, max.	18.50-19.00
Piston alloys (No. 122 type)	16.00-16.50
No. 12 alum. (No. 2 grade)	14.75-15.25
108 alloy	15.50-16.00
195 alloy	17.00-17.50
13 alloy	18.50-19.00
AXS-679	15.75-16.25
5% Ti, Aluminum, f.o.b.	
Low copper	31.00
2% copper	28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-95½%	15.75-16.25
Grade 2—92-95%	14.75-15.25
Grade 3—90-92%	13.75-14.25
Grade 4—85-90%	12.75-13.25

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	34⅝
Electrodeposited	28⅞
Rolled, oval, straight, delivered	31.84
Ball anodes	32⅞
Brass, 80-20	
Cast, oval, 15 in. or longer	30⅜
Zinc, oval, 99.886, f.o.b. Detroit	22½
Ball anodes	20½
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	48.00
Copper sulfate, 99.5 crystals, bbl.	9.10
Nickel salts, single or double, 4-100 lb bags, frt. allowed	18.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbl.	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅝, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	30.68	....	30.28
Copper, hot-rolled	....	26.53	....
Copper, drawn	....	27.78	....
Low brass	27.97	27.66	30.88*
Yellow brass	26.77	26.46	29.78*
Red brass	28.36	28.05	31.27*
Naval brass	31.77	25.83	27.08
Leaded brass	....	21.34	25.47
Commercial bronze	29.28	28.97	31.94*
Manganese bronze	35.27	29.18	30.68
Phosphor bronze, 5 pct	48.92	49.17	....
Muntz metal	29.78	25.34	26.59
Everdur, Herculoy, Olympic, etc.	34.63	33.58	..
Nickel silver, 10 pct	37.80	40.14	40.34
Architectural bronze	....	....	25.47

*Seamless tubing

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	13¼	12½
Yellow brass	10¾	10
Red brass	11⅞	11⅛
Commercial bronze	12	10¾
Manganese bronze	10¾	10
Leaded brass rod ends	10½	..

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	12.00
No. 2 copper wire	11.00
Light copper	10.00
Refinery brass	9.50 to 9.75*
Radiators	6.50

*Dry copper content.

Ingot Makers' Scrap

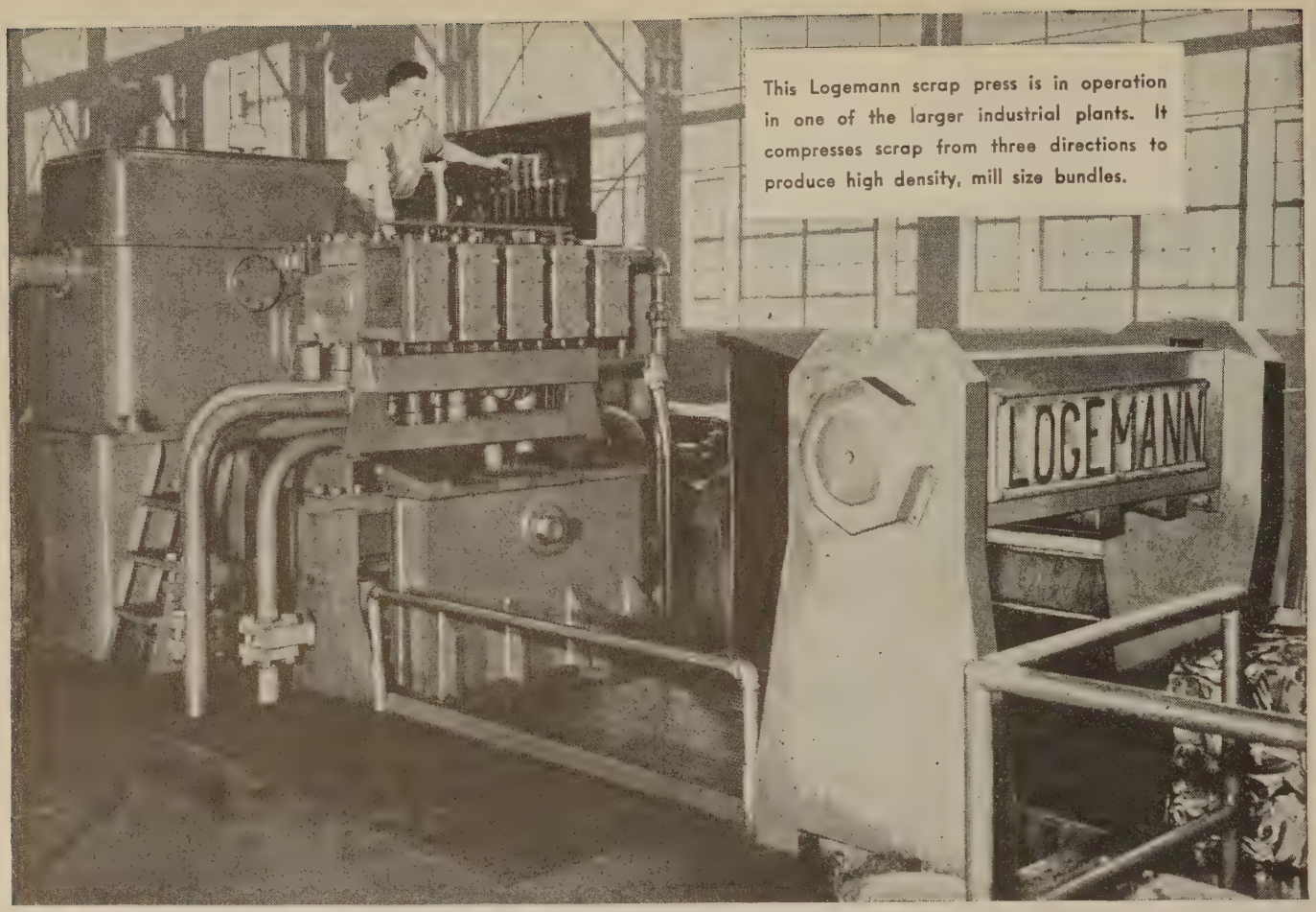
(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	12.00
No. 2 copper wire	11.00
Light copper	10.00
No. 1 composition	9.00
No. 1 comp. turnings	8.50
Rolled brass	7.00 to 7.25
Brass pipe	8.25
Radiators	7.25
Heavy yellow brass	6.75
Aluminum	
Mixed old cast	7.50
Mixed old clips	7.50
Mixed turnings, dry	6.00
Pots and pans	7.50
Low copper	11.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	10 —10½
No. 2 heavy copper and wire	9 — 9½
Light copper	8 — 8½
Auto radiators (unsweated)	5¾— 6
No. 1 composition	7¾— 8
No. 1 composition turnings	7¼— 7¾
Clean red car boxes	6½— 6¾
Cocks and faucets	6½— 6¾
Mixed heavy yellow brass	5¼— 5½
Old rolled brass	5¾— 6
Brass pipe	6¾— 7
New soft brass clippings	8½— 9
Brass rod ends	6½— 7
No. 1 brass rod turnings	5½— 6
Aluminum	
Alum. pistons and struts	3¼— 3½
Aluminum crankcases	5 — 5½
2S aluminum clippings	9 — 9½
Old sheet and utensils	5 — 5½
Borings and turnings	3
Misc. cast aluminum	5 — 5½
Dural clips (24S)	5 — 5½
Zinc	
New zinc clippings	4½— 5
Old zinc	3 — 3½
Zinc routings	2 — 2½
Old die cast scrap	2
Nickel and Monel	
Pure nickel clippings	16 —17
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	10½—11½
Clean Monel turnings	6 — 7
Old sheet Monel	8 — 9
Old Monel castings	7 — 8
Inconel clippings	10 —11
Nickel silver clippings, mixed	6 — 7
Nickel silver turnings, mixed	5½— 6
Lead	
Soft scrap, lead	7 — 7½
Battery plates (dry)	4¼— 4½
Magnesium Alloys	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	70 —72
No. 1 pewter	47 —49
No. 1 auto babbitt	40 —42
Mixed common babbitt	9 — 9½
Solder joints	10½—11
Siphon tops	45 —47
Small foundry type	11½—12
Monotype	9½—10
Lino. and stereotype	9 — 9½
Electrotype	7 — 7½
New type shell cuttings	8 — 8¼
Hand picked type shells	4
Lino. and stereo. dross	5 — 5½
Electro. dross	3½— 4



This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

Self-Contained . . . .
Triple Compression . .
Automatically Controlled

LOGEMANN SCRAP PRESSES

handle high tonnages with minimum labor . . . *at low cost*

•

LOGEMANN METAL BALERS

. . . are built in a large range of sizes to meet specific conditions. Let Logemann's engineering service help you arrive at the most efficient and economical way of handling your scrap.

•

The compact unit illustrated is completely self-contained with oil tank and pump located directly over the press . . . utilizing the advantages of short pipe lines. Automatic controls, mounted in front of pump, give the operator full visibility at all times. Controls operate rams successively within a single rigid box. There is no complex construction which means there is *no need for specially-trained maintenance crews.*

Both two-ram and three-ram models are available with automatic controls or for manual manipulation.

Logemann Bros. Co. have specialized in the production of scrap metal presses for sheet mills, stamping plants, scrap yards, and metal manufacturing plants of all types for nearly 75 years. Write for full information — please state the nature of your scrap and tonnage.

LOGEMANN BROTHERS COMPANY
3164 W. Burleigh Street • Milwaukee 10, Wisconsin

SCRAP

Prices Slip Lower In Dull Market

New York

• • • **Major market** areas did not show any signs of encouragement during the past week. Consumers have not been buying for quite some time and some dealers and brokers cannot quote prices any longer for lack of market activity. Some mills and foundries are only taking token tonnages while others are completely out of the market—at least until their own business shows some improvement.

THE IRON AGE scrap composite dropped another 67¢ per gross ton this week. It is now $20.25 per gross ton, a new low for the year. This represents a drop of $22.75 per gross ton since the first of the year. Prices of No. 1 heavy melting steel this week are: Pittsburgh, $21 to $22; Chicago, $20.50 to $21; and Philadelphia, $18 to $19.

All major scrap consuming areas showed a lack of buying interest on the part of the consumer. Some sources expressed hope of renewed market activity in September, after the end of the vacation period. However, many are of the opinion that it will not develop then because of the decline in the steel operating rate. One thing is certain; there is very little stockpiling by dealers, and if there is any unusual demand prices probably would firm immediately and rise rapidly.

Recent railroad lists have been quite heavy. This material has usually been bought at prices higher than the going market price. Undoubtedly competitive bidding has been responsible for these higher prices since some of this material has been bought by speculators and not consumers.

•

PITTSBURGH—On appraisal of all market factors the quotation on No. 1 heavy melting steel is off $1 a ton here this week. These factors are: (1) Pittsburgh Steel, which has been paying $23 a ton for this grade for some time is out of the market this week; (2) no other Pittsburgh mill is buying; (3) declining operating rates make even token purchases for next month look less promising; and (4) some 500 tons of No. 1 steel have already been sold at $21 a ton. Other openhearth grades are also weaker. No. 2 steel purchases by brokers set the top price on this grade at $20.50 and some No. 1 is moving on these sales at this price. A few small-lot purchases of low phos. were made here during the past week at about $26 a ton but at the same time brokers were offering to sell between 1000 and 2000 tons at $23. This week they'll sell for less.

•

CHICAGO—Little or no activity pervades the market again last week. The mills are still inactive except for accepting shipments on old orders and taking what earmarked scrap they feel they must take. In cast grades a strong undertone persists. This is not due to buying in volume but exists because the brokers realize no tonnage of cast scrap is on hand anywhere. Yards haven't bothered to sort out and if any foundry started to buy most brokers would be woefully short. To preclude taking what would amount to a bad order some brokers have recently upped their bids on railroad cast in the effort to forestall difficulty if and when the foundries come back into the market.

•

PHILADELPHIA — The market here continued inactive last week. Brokers were virtually without orders. The sentiment of all factors was bearish. What business was done in heavy melting grades was at lower prices. Cast was unchanged, except for heavy breakable which dropped $1. Machine shop turnings dropped 50¢ but other turnings grades were unchanged. One mill whose openhearths had been closed down put one on last week.

•

CLEVELAND—Mills in this district are taking off furnaces and continue out of the market. Brokers are virtually without orders. Aside from blast furnace grades, any scrap moving here is going to the Valley. Market factors do not expect any resumption of activity until the end of the summer. In Youngstown there are still some small orders out. Prices quoted are nominal, but an appraisal of the market indicates that No. 1 melting should be quoted 50¢ lower here and in the Valley. In Cleveland, machinery cast is off $1. Sympathetically, rails are also down $1, although the recent Wheeling and Lake Erie sale was at $25 for random lengths. A month ago the Central got $29.99. Railroad and plant scrap is being bought at higher prices than quoted for dealer scrap which is not moving.

•

CINCINNATI—Furnaces in the local market are shutting down for several weeks. There is no new buying, and the foundry scrap market is quiet. Heavy melting grades are quoted $1 lower, as well as shovelings and borings and turnings. Cast grades are down $1. Random rails are down $2.

DETROIT—The local scrap market drifted lower again this week. Orders are practically nonexistent and the presence on the market next week of a record-breaking tonnage of industrial scrap is expected to depress still further quotations on dealer scrap quoted in IRON AGE. There has been some recent interest in cast iron but other grades are absolutely listless, it is reported.

•

NEW YORK—The market lacks support with few consumers willing to do any buying. Some sources expect no change in the listless market unless mill operations drop off very sharply. There are no outstanding orders to speak of and the demand seems to be getting smaller from week to week. A slow summer is expected due to the vacation periods. Prices are no longer a market factor here and it will take some time to determine a level at which prices will be stabilized. Prices quoted represent an appraisal of all market conditions.

•

ST. LOUIS—The scrap iron market continues slow and orders are very thin. Shipments on old orders are slowly coming in. But district steel mills are unconcerned, as their inventories are sufficient for several months' operations, especially in view of cutbacks. Railroad lists are heavy: Louisville & Nashville, 8800 tons and St. Louis-San Francisco, 50 carloads.

•

BOSTON—After hovering around the $14 mark for several weeks, No. 1 steel dipped further and is now quoted at a new low of $13. Other scrap items slipped slightly and indications point to a dull outlook this summer. A few Canadian orders in machine shop turnings appear to be filled. Cast iron demand is just about zero.

•

BIRMINGHAM—A little strength is being shown here by No. 1 cupola cast but practically no interest is being shown for other material. Republic Steel Corp. normally the biggest user of openhearth grades in the South, is out of the market. Receipts at dealers' yards remain very slow and prices are unchanged generally.

•

BUFFALO—Local scrap production remained low this week with yards generally on a 5-day week and working forces down to 60 pct of a year ago. The reduced steel rate, approach of inventory and vacation time and apprehension over the coal and steel labor negotiations combined to retard buying. One consumer, however, was reported paying a bonus of up to $1 a ton for small lots of No. 1 factory bundles, prime No. 2 steel and shoveling turnings, and a few cars of low phos. steel changed hands at around $21. Otherwise business was dead.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. menting	$21.00 to $22.00
R.R. hvy. melting	22.50 to 23.00
No. 2 hvy. melting	19.50 to 20.50
No. 2 bundles	17.50 to 18.50
R.R. scrap rails	23.00 to 24.00
Rails 2 ft and under	26.50 to 27.50
No. 1 comp'd bundles	21.00 to 22.00
Hand bdld. new shts.	19.50 to 20.50
Hvy. steel forge turn.	17.50 to 18.00
Mach. shop turn.	14.50 to 15.00
Shoveling turn.	17.50 to 18.00
Mixed bor. and ms. turn.	14.50 to 15.00
Cast iron borings	17.50 to 18.00
No. 1 mach. cast.	26.00 to 27.00
Mixed yard cast.	21.50 to 22.50
Hvy. breakable cast.	20.50 to 21.50
Malleable	22.50 to 23.00
RR. knuck. and coup.	26.00 to 26.50
RR. coil springs	26.00 to 26.50
RR. leaf springs	26.00 to 26.50
Rolled steel wheels	26.00 to 26.50
Low phos.	22.00 to 22.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.50 to $21.00
No. 2 hvy. melting	18.50 to 19.00
Factory bundles	20.50 to 21.00
No. 1 dealers' bundles	17.00 to 18.00
No. 2 dealers' bundles	16.50 to 17.00
Mach. shop turn.	11.00 to 12.00
Short shov. turn.	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Mix. borings and turn.	9.00 to 10.00
Low phos. hvy. forge	24.00 to 24.50
Low phos. plates	22.00 to 23.00
No. 1 RR. hvy. melt.	22.00 to 23.50
Rerolling rails	27.00 to 28.00
Miscellaneous rails	23.50 to 24.00
Angles and splice bars	25.00 to 25.50
Locomotive tires, cut	26.50 to 27.00
Cut bolster & side frames.	23.00 to 24.00
Standard stl. car axles	27.00 to 28.00
No. 3 steel wheels	24.00 to 24.50
Couplers and knuckles	23.00 to 24.00
Rails, 2 ft and under	27.00 to 28.00
Malleable	22.00 to 24.00
No. 1 mach. cast.	28.50 to 29.25
No. 1 agricul. cast.	26.00 to 26.50
Heavy breakable cast.	22.50 to 23.50
RR. grate bars	18.00 to 18.50
Cast iron brake shoes	17.50 to 18.50
Cast iron car wheels	27.00 to 27.50

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 bundles	18.00 to 19.00
No. 2 bundles	15.00 to 16.00
Mach. shop turn.	7.00 to 8.00
Shoveling turn.	7.00 to 8.00
Cast iron borings	8.00 to 9.00
Mixed bor. and turn.	7.00 to 8.00
Low phos. 18 in. under	24.00 to 25.00
No. 1 cupola cast.	25.00 to 26.00
Hvy. breakable cast.	17.00 to 18.00
Rails 18 in. and under	29.00 to 30.00
Rails random length	19.00 to 20.00
Drop broken	29.00 to 30.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$13.00
No. 2 hvy. melting	$10.50 to 11.00
No. 1 bundles	12.00 to 12.75
No. 2 bundles	10.00 to 11.00
Bushelings	9.50 to 10.00
Shoveling turn.	9.00 to 9.50
Machine shop turn.	5.00 to 5.50
Mixed bor. and turn.	4.50 to 5.00
Cl'n cast chem. bor.	10.00 to 12.00
No. 1 machinery cast.	27.00 to 31.00
No. 2 machinery cast.	20.00 to 22.50
Heavy breakable cast.	17.50 to 18.50
Stove plate	17.50 to 19.50

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$14.50 to $15.00
No. 2 hvy. melting	12.00 to 12.50
No. 1 bundles	14.50 to 15.00
New busheling	14.50 to 15.00
Flashings	14.50 to 15.00
Mach. shop turn.	8.50 to 9.00
Shoveling turn.	9.50 to 10.00
Cast iron borings	9.50 to 10.00
Mixed bor. and turn.	8.50 to 9.00
Low phos. plate	14.50 to 15.00
Heavy breakable cast.	13.50 to 16.50
Stove plate	16.00 to 17.00
Automotive cast.	21.00 to 23.00
No. 1 cupola cast.	19.50 to 21.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 bundles	18.00 to 19.00
No. 2 bundles	15.50 to 16.50
Mach. shop turn.	11.00 to 12.00
Shoveling turn.	13.00 to 14.00
Mixed bor. and turn.	10.00 to 11.00
Clean cast chemical bor.	16.00 to 17.00
No. 1 machinery cast.	27.00 to 28.00
No. 1 mixed yard cast.	24.00 to 25.00
Hvy. breakable cast	23.00 to 24.00
Hvy. axle forge turn.	18.00 to 19.00
Low phos. electric furnace	22.00 to 22.50
Low phos. acid openhearth	21.00 to 21.50
Low phos. bundles	18.00 to 19.00
RR. steel wheels	22.00 to 22.50
RR.coil springs	22.00 to 22.50
RR. malleable	23.00 to 24.00
Cast iron carwheels	27.00 to 28.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	17.00 to 18.00
No. 2 bundled sheets	15.00 to 16.00
Mach. shop turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Locomotive tires, uncut	19.00 to 20.00
Mis. std. sec. rails	21.00 to 22.00
Steel angle bars	26.00 to 27.00
Rails 3 ft and under	26.00 to 27.00
RR. steel springs	21.00 to 22.00
Steel car axles	25.00 to 27.00
Brake shoes	20.00 to 21.00
Malleable	22.00 to 23.00
Cast iron car wheels	24.00 to 25.00
No. 1 machinery cast.	23.00 to 25.00
Hvy. breakable cast.	19.00 to 20.00
Stove plate	20.00 to 21.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	18.00
No. 2 bundles	16.00
No. 1 busheling	18.00
Long turnings	13.00
Shoveling turnings	15.00
Cast iron borings	15.00
Bar crops and plate	22.50
Structural and plate	22.50
No. 1 cupola cast.	26.00
Stove plate	20.00
No. 1 RR. hvy. melt.	$20.00 to 20.50
Steel axles	20.00
Scrap rails	20.00
Rerolling rails	24.00
Angles & splice bars	22.00 to 23.00
Rails 2 ft & under	23.00 to 24.00
Cast iron carwheels	18.00 to 19.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.50 to $21.00
No. 2 hvy. melting	18.50 to 19.00
No. 1 bundles	20.50 to 21.00
No. 2 bundles	17.00 to 17.50
Mach. shop turn.	11.00 to 11.50
Short shov. turn.	18.00 to 18.50
Cast iron borings	18.00 to 18.50
Low phos.	22.00 to 22.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$12.00 to $13.00
No. 2 hvy. melting	10.50 to 11.50
No. 2 bundles	9.50 to 10.50
Mach. shop turn.	5.25 to 5.75
Mixed bor. turn.	5.25 to 5.75
Shoveling turnings	7.00 to 8.00
Machinery cast.	20.50 to 21.00
Mixed yard cast.	19.00 to 19.50
Heavy breakable cast.	18.50 to 19.50
Charging box cast.	18.50 to 19.50
Unstrp. motor blks.	14.50 to 15.00
Cl'n cast chem. bor.	11.00 to 13.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50 to $20.50
No. 2 hvy. melting	17.50 to 18.50
No. 1 bundles	17.50 to 18.50
No. 2 bundles	15.50 to 16.50
No. 1 busheling	17.50 to 18.50
Mach. shop turn.	11.00 to 11.50
Shoveling turn.	15.00 to 15.50
Cast iron borings	15.00 to 15.50
Mixed bor. and turn.	15.00 to 15.50
Cupola cast.	25.00 to 26.00
Mixed yard cast.	23.00 to 24.00
Stove plate	23.00 to 24.00
Small indus, malleable	19.00 to 20.00
Low phos. plate	21.00 to 22.00
Scrap rails	25.00 to 26.00
Rails 3 ft & under	32.00 to 33.00
RR. steel wheels	25.00 to 26.00
RR. coil & leaf spgs.	25.00 to 26.00
RR. knuckles & coup.	25.00 to 26.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.50 to $18.00
No. 2 hvy. melting	16.00 to 16.50
No. 1 bundles	17.50 to 18.00
No. 2 bundles	15.00 to 15.50
No. 1 busheling	17.50 to 18.00
Drop forge flashings	17.50 to 18.00
Mach. shop turn.	10.00 to 11.00
Shoveling turn.	17.50 to 18.00
Steel axle turn.	18.00 to 19.00
Cast iron borings	17.50 to 18.00
Mixed bor. & turn.	17.50 to 18.00
Low phos. 2 ft and under	20.00 to 21.00
No. 1 mach. cast.	26.00 to 27.00
Malleable	21.00 to 22.00
RR. cast	27.50 to 28.50
Railroad grate bars	20.00 to 21.00
Stove plate	20.00 to 21.00
RR. hvy. melting	20.00 to 21.00
Rails 3 ft and under	27.00 to 28.00
Rails 18 in. and under	28.00 to 29.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	28.00
No. 1 cupola cast.	$20.00 to 25.00
RR. hvy. melting	20.00
Rails	23.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	30.00
No. 1 cupola cast.	$24.00 to 26.00
RR. hvy. melting	20.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$20.00
No. 1 & No. 2 bales	16.00
No. 3 bales	13.00
Elec. fur. 1 ft and under	22.00
No. 1 cupola cast.	$20.00 to 27.00
RR. hvy. melting	20.00

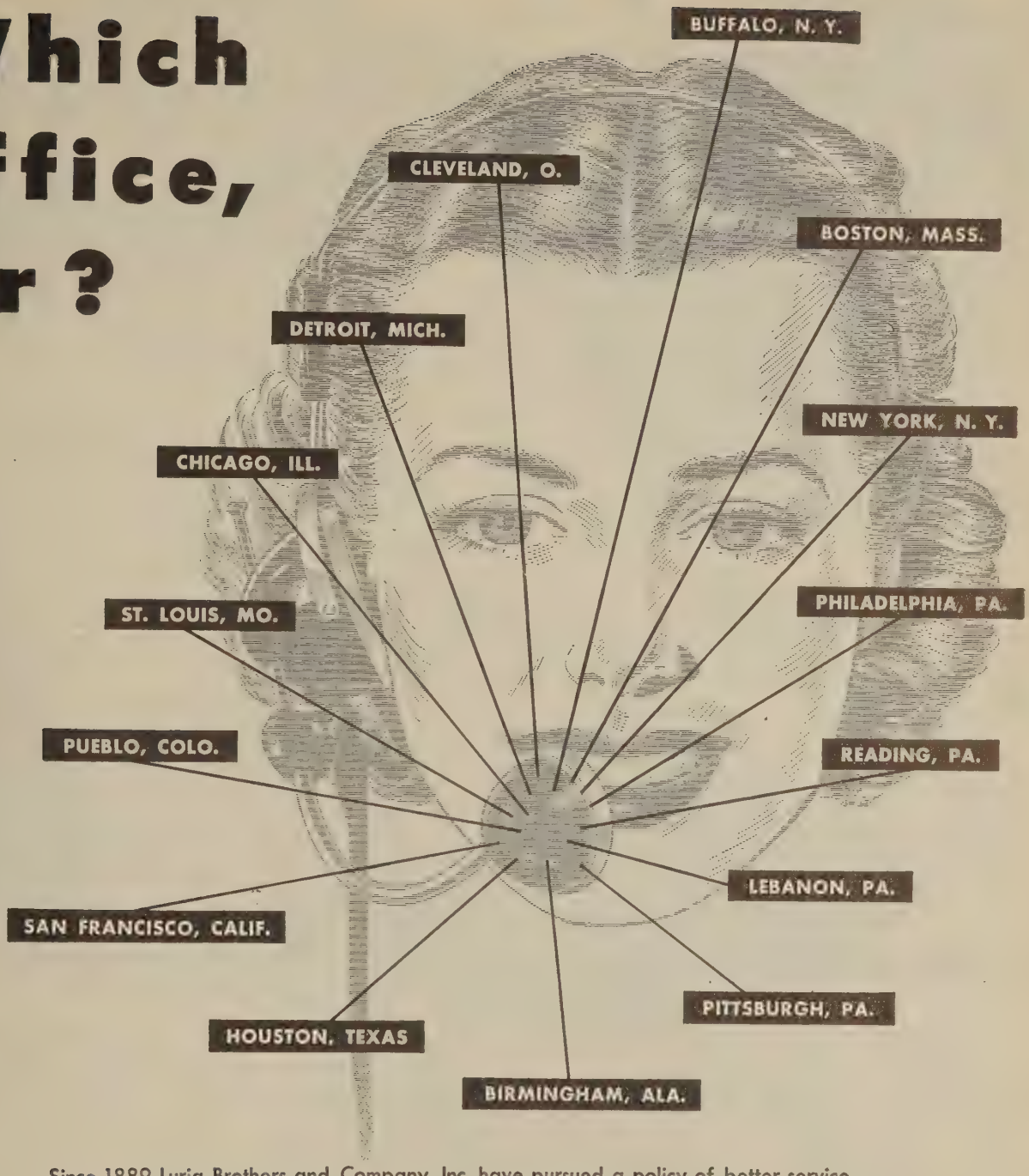
HAMILTON, ONT.

Per gross ton delivered to consumer: Cast Grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	$48.00 to 50.00
No. 2 cast.	44.00 to 45.00

*Ceiling Price.

Which office, sir?



Since 1889 Luria Brothers and Company, Inc. have pursued a policy of better service made possible by years of "know how" and personnel who have the desire to please.

The expansion of our organization, with offices located in 15 major cities, is in accordance with our policy to give better service to our customers.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

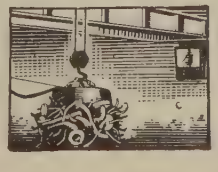
LURIA BROTHERS AND COMPANY, INC.

Main Office

LINCOLN-LIBERTY BLDG.
Philadelphia 7, Pennsylvania

Yards

LEBANON, PA. • READING, PA.
DETROIT (ECORSE), MICH.
MODENA, PA. • PITTSBURGH, PA.
ERIE, PA.



Branch Offices

BIRMINGHAM, ALA. Empire Bldg.
BOSTON, MASS. Statler Bldg.
BUFFALO, N.Y. Genesee Bldg.
CHICAGO, ILL. 100 W. Monroe St.
CLEVELAND, O. 1022 Midland Bldg.
DETROIT, MICH. 2011 Book Bldg.
HOUSTON, TEXAS 803-4-5 Milam Bldg.
LEBANON, PA. Luria Bldg.
NEW YORK, N.Y. Woolworth Bldg.
PITTSBURGH, PA. Oliver Bldg.
PUEBLO, COLO. Colorado Bldg.
READING, PA. Luria Bldg.
ST. LOUIS, MO. 2110 Railway Exchange Bldg.
SAN FRANCISCO, CAL. Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type: declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	June 21, 1949	June 14, 1949	May 24, 1949	June 22, 1948
Hot-rolled sheets	3.25	3.25	3.25	2.775
Cold-rolled sheets	4.00	4.00	4.00	3.495
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.913
Hot-rolled strip	3.25	3.25	3.25	2.775
Cold-rolled strip	4.038	4.038	4.038	3.535
Plates	3.40	3.40	3.40	2.93
Plates wrought iron	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.70
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	5.90
Special coated mfg. ternes	6.65	6.65	6.65	5.80
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.35	2.875
Cold-finished bars	3.995	3.995	3.995	3.483
Alloy bars	3.75	3.75	3.75	3.213
Structural shapes	3.25	3.25	3.25	2.767
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	3.608
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.725
Light rails	3.55	3.55	3.55	3.05
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00
Slabs, rerolling	52.00	52.00	52.00	45.00
Forging billets	61.00	61.00	61.00	54.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.40	3.133
Skelp	3.25	3.25	3.25	2.888

Pig Iron: (per gross ton)	June 21, 1949	June 14, 1949	May 24, 1949	June 22, 1948
No. 2, foundry, Phila.	$50.56	$50.56	$50.56	$44.74
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*	45.47	45.47	45.47	45.47
No. 2, Birmingham	39.38	39.38	39.38	39.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	39.00
Basic del'd Philadelphia*	49.74	49.74	49.74	44.24
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	39.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	65.55
Ferromanganese‡	173.40	173.40	173.40	145.00

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.
*Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap (per gross ton)	June 21, 1949	June 14, 1949	May 24, 1949	June 22, 1948
Heavy melt'g steel, P'gh.	*$21.50*	$22.50	$22.75	$40.25
Heavy melt'g steel, Phila.	*18.50*	19.50	22.00	42.50
Heavy melt'g steel, Ch'go	20.75	20.75	21.50	39.25
No. 1, hy. comp. sh't, Det.	*14.75*	15.75	16.75	35.50
Low phos. Young'n	22.25	22.25	24.75	45.25
No. 1, cast, Pittsburgh	26.50	26.50	27.75	63.75
No. 1, cast, Philadelphia	27.50	27.50	28.00	67.00
No. 1, cast, Chicago	28.88	28.88	27.00	69.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$12.75
Foundry coke, prompt	16.25	16.25	16.25	16.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	*1600*	16.50	18.00	21.50
Copper, Lake Conn.	18.625	18.625	18.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	*9.00*	9.50	12.00	12.00
Lead, St. Louis	11.85	11.85	12.85	17.30
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.93	42.93	42.93	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	35.00

Composite Prices . .

Starting with the issue of May 12, 1949 the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive, see p. 139 of May 12, 1949 issue. The composite under the old method this week would have been 3.73330¢ per lb.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
June 21, 1949	3.705¢ per lb.	$45.91 per gross ton	*$20.25* per gross ton
One week ago	3.705¢ per lb.	$45.91 per gross ton	$20.92 per gross ton
One month ago	3.705¢ per lb.	$45.91 per gross ton	$22.08 per gross ton
One year ago	3.211¢ per lb.	$40.51 per gross ton	$40.66 per gross ton

	HIGH		LOW	
1949	3.720¢	Jan. 1	3.705¢	May 3
1948	3.721¢	July 27	3.193¢	Jan. 1
1947	3.193¢	July 29	2.848¢	Jan. 1
1946	2.848¢	Dec. 31	2.464¢	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1
1944	2.396¢		2.396¢	
1943	2.396¢		2.396¢	
1942	2.396¢		2.396¢	
1941	2.396¢		2.396¢	
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16
1939	2.35367¢	Jan. 3	2.26689¢	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2
1933	1.95578¢	Oct. 3	1.75836¢	May 2
1932	1.89196¢	July 5	1.83901¢	Mar. 1
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29
1929	2.31773¢	May 28	2.26498¢	Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

HIGH		LOW	
$46.82	Jan. 4	$45.91	May 10
46.91	Oct. 12	39.58	Jan. 6
37.98	Dec. 30	30.14	Jan. 7
30.14	Dec. 10	25.37	Jan. 1
25.37	Oct. 23	23.61	Jan. 2
$23.61		$23.61	
23.61		23.61	
23.61		23.61	
$23.61	Mar. 20	$23.45	Jan. 2
23.45	Dec. 23	22.61	Jan. 2
22.61	Sept. 19	20.61	Sept. 12
23.25	June 21	19.61	July 6
23.25	Mar. 9	20.25	Feb. 16
19.74	Nov. 24	18.73	Aug. 11
18.84	Nov. 5	17.83	May 14
17.90	May 1	16.90	Jan. 27
16.90	Dec. 5	13.56	Jan. 3
14.81	Jan. 5	13.56	Dec. 6
15.90	Jan. 6	14.79	Dec. 15
18.71	May 14	18.21	Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

HIGH		LOW	
$43.00	Jan. 1	$20.25	June 21
43.16	July 27	39.75	Mar. 9
42.58	Oct. 28	29.50	May 20
31.17	Dec. 24	19.17	Jan. 1
19.17	Jan. 2	18.92	May 22
19.17	Jan. 11	15.76	Oct. 24
$19.17		$19.17	
19.17		19.17	
$22.00	Jan. 7	$19.17	Apr. 10
21.83	Dec. 30	16.04	Apr. 9
22.50	Oct. 3	14.08	May 16
15.00	Nov. 22	11.00	June 7
21.92	Mar. 30	12.67	June 9
17.75	Dec. 21	12.67	June 8
13.42	Dec. 10	10.33	Apr. 29
13.00	Mar. 13	9.50	Sept. 25
12.25	Aug. 8	6.75	Jan. 3
8.50	Jan. 12	6.43	July 5
11.33	Jan. 6	8.50	Dec. 29
17.58	Jan. 29	14.08	Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

WHEN YOUR PROBLEM IS SCRAP...

Since 1898—for over fifty years—Alter Co. has served the scrap consumer as well as the scrap producing industry and scrap dealer.

Without obligation we will be pleased to counsel with you.

Cast Iron
Electric Furnace Grades
Open Hearth
Foundry Steel
Sheet Iron for Baling
Stainless Steel
Non-Ferrous Metals

Over 50 Years

ALTER

COMPANY

1700 ROCKINGHAM ROAD DAVENPORT 2, IOWA

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Widths up to 12-in. inclusive. (2) 0.25 carbon and less. (3) Cokes, 1.25 lb, deduct 25¢ per base box. (4) 18 gage and heavier. (5) For straight length material only from producers to fabricators. (6) Also shafting. For quantities of 40,000 lb and over. (7) Carload lot in manufacturing trade. (8) Hollowware enameling, gages 29 to 31 only. (9) Produced to dimensional tolerances in AISI Manual Sec. 6. (10) Slab prices subject to negotiation in most cases. (11) San Francisco only. (12) Los Angeles only. (13) San Francisco and Los Angeles only. (14) Seattle only. (15) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00											$50.00			
Alloy	$51.00						(per net ton)					$51.00			
BILLETS, BLOOMS, SLABS Carbon, rerolling[10]	$52.00				$52.00	$52.00	(per net ton)						$52.00		$71.00
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)					$61.00	$61.00		$80.00
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)					$63.00			$82.00
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40	3.40		3.40	3.40		3.40	3.50			Worcester 3.70		3.40	4.05[11] 4.20[12]	
SHEETS Hot-rolled[4]	3.25	3.25	3.25	3.25	3.25	3.25 (Conshohocken,	3.25	3.25 Pa. 3.35)		Warren, Ashland = 3.25		3.45		3.95[13]	4.15
Cold-rolled	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	4.90
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[13]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[1]	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	4.40
Cold-rolled[2]	4.00	4.15		4.00		4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.25			4.90
TINPLATE Cokes, 1.50 lb.[3] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal. =$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[8]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05	4.00
Reinforcing[5]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	4.00
Cold-finished[6]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon =3.75				4.05	3.75	4.80[12]	4.75
Alloy cold-drawn	4.65	4.65	4.65	4.65		4.65	4.65	Massillon =4.65			Worcester 4.95				
PLATE Carbon steel[9]	3.40	3.40	3.40	3.40	3.40 Cons	3.40 hohocken	3.40 =3.50	3.40 Coatesville =3.50, Claymont =3.50 Geneva =3.40, Harrisburg =3.50				3.65	3.40	4.30[14]	4.00
Floor plates	4.55	4.55		4.55				Conshohocken =4.55							
Alloy	4.40	4.40							Coatesville =4.50						
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30	Bethlehem =3.30, Geneva, Utah =3.25						3.30	3.80 to 3.90[14]	3.80
MANUFACTURERS' WIRE[7] Bright	4.15	4.15		4.15	4.15		4.15	4.25	Duluth =4.15, Worcester =4.45				4.15	5.15[11]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester =5.50 New Haven, Trenton =5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel							Straight Chromium		
	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	15.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.80	34.00	50.50	39.50	44.00	26.00	26.50–27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil hardened manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢
†CF&I, $3.30.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless clad		
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville	29.00	
Aluminized steel sheets		
Hot dip, f.o.b. Butler, Pa.		7.75

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	*Pittsburg, Calif.*
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	*Pittsburg, Calif.*
Annealed fence wire†	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic Sharon*	Republic	Alan Wood	Inland	Bethle-hem	Jones & Laughlin	Youngs-town Sheet & Tube	Great Lakes Sharon*
Plates	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.45
Sheets									
Hot-rolled	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	5.15
Cold-rolled	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.05	6.25
Galvanized	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled	4.95	4.95	4.95	.....	4.95	4.95	4.95	4.95	5.15
Cold-rolled	.....	.....	6.05	.....	.....	6.05	6.05	6.05	6.25
Shapes	.....	4.95	.....	.....	4.95	5.05	4.95	4.95	.....
Beams	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled	5.10	5.10	5.10	.....	5.10	5.10	5.10	5.10	5.30
Bar shapes	.....	5.10	.....	.....	5.10	5.10	5.10	5.10	.....

* Sheets and strip.

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, about $200.00 per net ton.

STANDARD, THREADED AND COUPLED

	Black*	Galv.
Steel, buttweld		
½-in.	43 to 41	26½ to 24½
¾-in.	46 to 44	30½ to 28½
1-in.	48½ to 46½	33½ to 31½
1¼-in.	49 to 47	34 to 32
1½-in.	49½ to 47½	34½ to 32½
2-in.	50 to 48	35 to 33
2½ to 3-in.	50½ to 48½	35½ to 33½
Steel, lapweld		
2-in.	39½	26 to 24
2½ to 3-in.	43½ to 42½	28 to 27
3½ to 6-in.	46½ to 42½	31 to 27
Steel, seamless		
2-in.	38½ to 27	23 to 11½
2½ to 3-in.	41½ to 32½	26 to 17
3½ to 6-in.	43½ to 38½	28 to 23
Wrought Iron, buttweld		
½-in.	+20½	+47
¾-in.	+10½	+36
1 & 1¼ in.	+ 4½	+27
2-in.	— 1½	+23½
3-in.	— 2	+23
Wrought Iron, lapweld		
2-in.	+ 7½	+31
2½ to 3½-in.	+ 5	+26½
4-in.	list	+20½
4½ to 8-in.	+ 2	+22

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	27 to 25
¾-in.	46 to 44	31 to 29
1-in.	48 to 46	34 to 32
1¼-in.	48½ to 46½	34½ to 32½
1½-in.	49 to 47	35 to 33
2-in.	49½ to 47½	35½ to 34½
2½ to 3-in.	50 to 48	36 to 34
Steel, lapweld		
2-in.	39½ to 38½	25 to 24
2½ to 3-in.	44½ to 42½	30 to 28
3½ to 6-in.	48 to 44	33½ to 31½
Steel, seamless		
2-in.	37½ to 32½	23 to 18
2½ to 3-in.	41½ to 36½	27 to 23
3½ to 6-in.	45	30½
Wrought Iron, buttweld		
½-in.	+16	+40
¾-in.	+ 9½	+34
1 to 2-in.	— 1½	+23
Wrought Iron, lapweld		
2-in.	+ 4½	+27½
2½ to 4-in.	— 5	+16
4½ to 6-in.	— 1	+20½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left column.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$95.70
6 to 24-in., del'd N. Y.	$92.50 to 97.40
6 to 24-in., Birmingham	82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	109.30

Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. shorter	34
All diam., longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed (*Hexagon or Square*)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(*½ in. and larger*)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(*7/16 in. and smaller*)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(*In packages*)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

	Per gross Ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	30.00 to 31.00¢
Antimony	51.17¢
Brass, 10 ton lots	22.75 to 25.75¢
Copper, electrolytic	28.125¢
Copper, reduced	27.75¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	20.22¢
Manganese	55.00 to 60.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.00¢
Tin	$1.25
Tungsten, 99%	$2.90
Zinc, 10 ton lots	14.75 to 16.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$22.95
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Plainesville, Ohio, f.o.b.	20.90
Erie, del'd	$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(*F.o.b. Works*)

Fire Clay Brick

	Carloads, Per 1000
First quality, Pa., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	$85.00 to 95.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Chester	$69.00

Magnesite Brick

Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

Std. ⅜-in. grains

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.00 to 56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢: Missouri Valley, add 20¢ .. $12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 15¢ to base price except Cincinnati and New Orleans (*), add 10¢; New York, add 20¢.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.95-7.11	5.37	....	5.56	5.36	5.42	6.16	....	9.60-10.10	....	....
Birmingham	5.00	....	6.40	5.00		5.15	5.00	5.10	6.57	....	....	....	....
Boston	5.55	6.45-6.75	7.11-7.61	5.60-5.95	6.75	5.80	5.42	5.52	6.27	9.67-9.79	10.04-10.07	11.23	11.47
Buffalo	4.85	5.75	7.43-7.57	5.30	7.27	5.35	5.10	5.05-5.15	5.90	9.60-9.70	9.85-9.95	11.15	11.40-11.45
Chicago	4.85	5.75	6.95-7.10	4.85	5.55-6.68	5.10	4.90	4.90	5.70	8.90	9.26	10.25	10.55
Cincinnati*	5.16-5.51	5.84-6.28	6.59-6.93	5.28-5.43	....	5.53-5.85	5.33	5.33-5.48	6.08-6.20	9.74	9.99	11.19	11.44
Cleveland	4.85-5.16	5.75-6.06	6.15-7.46	5.03-5.15	....	5.21-5.54	5.01-5.47	5.01-5.34	5.70-5.97	9.49-9.50	9.74-9.75	10.95	11.19-11.20
Detroit	5.28-5.32	6.07-6.18	7.39-7.58	5.27-5.47	6.27-6.58	5.52-5.57	5.33-5.40	5.33-5.55	6.00-6.10	9.67	9.92	11.11	11.35
Houston	6.70-6.95	....	7.30	6.70	....	6.70	6.20-6.70	6.40-6.65	7.60	10.45	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.36	5.54	5.34	5.34	6.14	11.25	11.39	....	....
Los Angeles	6.45	7.80[19]-7.90[1]	8.05	6.65	8.35[5]	6.15	5.95	6.10	7.95[14]	10.95[15]	10.90[15]-14.70	12.45[15]	12.70[15]-16.45
Memphis	5.75-5.80	6.60	7.20	5.80-5.95	6.80	5.95-6.00	5.75	5.75	6.53	....	....	....	....
Milwaukee	5.03	5.93	7.13-7.18	5.03-5.38	6.86	5.28	5.08	5.08	5.88	9.53	9.78	10.98	11.23
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[6]	....	....	....	....
New York	5.40	6.31-6.46	6.90-7.00	5.62-5.72	....	5.70	5.33	5.57	6.36-6.41	9.28-9.73	9.58-9.98	11.18	11.43
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	5.08	6.24[13]	8.73	5.45	6.69	5.38	5.10	5.40	6.19	9.70	9.75	10.95	11.20
Pittsburgh	4.85	5.75[1]	6.90	5.00	6.00	5.05	4.90	4.90	5.65	8.90	9.20	10.25	10.55
Portland	6.50[8]-6.90	8.00[1]	8.80-9.10	6.85[8]	....	6.30[8]	6.35[8]	6.35[8]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.25[3]	8.20	8.80-9.30	7.65[3]	....	6.10[3]	5.70[3]	6.95[3]	8.30	....	....	....	....
San Francisco	6.15[8]-7.15	7.50[2]	7.90	6.75[8]	8.25[5]	6.30-6.35[8]	5.90[8]	5.90[8]	7.55	10.90[15]	10.85[15]	12.40[15]	12.65[15]
Seattle	6.70[4]-7.10	8.15[2]-8.65	8.80-9.30	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	....	10.35[15]	....	13.10[15]
St. Louis	5.22-5.37	6.12[1]-6.27	7.32	5.22	6.68-7.54	5.47	5.27	5.27	6.07-6.22	9.27-9.72	9.57-9.97	10.62-11.17	10.92-11.42
St. Paul	5.44	6.19-6.34	7.54-7.64	5.44	6.82	5.64-6.69	5.49	5.49	6.29	9.49	9.79	10.84	11.14

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1499 lb strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	.....	.....	.....	.....
Birmingham	38.88	39.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	52.50	53.00	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Lone Star, Texas	46.00	46.50†	.....	.....	.....
Neville Island	46.00	46.50	46.50	.....	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	.....	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	52.50	53.00	.....	.....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Steelton	5.48	.....	53.98	54.48	54.98	59.48
Cincinnati	Birmingham	6.09	44.97	45.47	.....	.....	.....
Jersey City	Steelton	3.67	.....	52.17	52.67	53.17	57.67
Los Angeles	Geneva-Ironton	7.13	53.13	63.63	.....	.....	.....
Mansfield	Cleveland-Toledo	3.03	49.03	49.53	49.53	50.03	54.03
Philadelphia	Bethlehem	2.17	50.17	.....	.....	.....	.....
Philadelphia	Swedeland	1.31	49.31	49.81	50.31	50.81	.....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Geneva-Ironton	7.13	53.13-	53.63-	.....	.....	.....
Seattle	Geneva-Ironton	7.13	53.13-	53.63-	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Gulf Ports	Lone Star, Texas	.....	50.50	51.00†			

† Low Phos., Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Weland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C,	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, $80.00; $78.50 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N.Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.40¢
Ton lots	8.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00¢
Ton lots, packed	11.25¢
Less ton lots	11.75¢

Boron Agents

Contract prices per lb. of alloy, del.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lot	$1.20
F.o.b. Wash., Pa.; 100 lb and over	
10 to 14% B.	.75
14 to 19% B.	1.20
19% min. B.	1.50
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25